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Trainers Guide

Deliverable 5.3

Submitted by:
Torsten Windmüller

**Gemeinnütziges Berufsförderungswerk des Baden-Württembergischen
Zimmerer- und Holzbaugewerbes GmbH**

Hackländerstr. 43
70184 Stuttgart, GERMANY



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1 Summary

This training guide was issued prior to commencement of the Train the Trainers programme and included the training material, a training matrix, and a comprehensive selection of background reference material that was used by the trainers to back up the training material.

As the programme was developed, it quickly emerged that a very broad foundation level of training material would be required for the training of craft's people. It was envisaged that participants may not have been in a classroom environment for many years and hence, the content would need to cover the fundamentals of energy as a basis for training on the Energy Performance Building Directive.

The challenge was to deliver a broad range of technical material at an understandable level. Typically trainers would be of a significantly higher qualification and hence trainers needed to be addressed on how to deliver the material, rather than in the technical intricacies of the course notes. To do this a systematic approach was taken to the developing this training guide.

- 1) A training matrix was developed for the five selected crafts. The course material was broken down into 15 modules and the relevance for each craft was outlined. (See Table 1). From this matrix, the trainer could determine what modules needed to be emphasised for each group.
- 2) The training material (in excess of 1,000 slides) was part of this package. The training material was divided into 15 relevant areas so that the trainer could easily work out a programme plan for each craft.
- 3) Finally, comprehensive reference material was given for each module and this reference material was outlined at the end of each presentation. A CD with this background material was given to each trainer in order for them to easily refer to the information.
- 4) A list of practical experience was developed (See Table 2). The trainers can choose from this list according to the possibilities of their institute. This practical training was added to increase the learning outcome of the tradesmen.

Table 1: Training Modules by Craft

Item	Title	Module I.D	Description	Building Fabric			Building Services	
				Carpenter	Joiner	Bricklayer Plasterer	Plumber Heating	Electrician
Chapter 1	Energy use in buildings	Module 1.1	Energy statistics	1.1	1.1	1.1	1.1	1.1
		Module 1.2	Legislation	1.2	1.2	1.2	1.2	1.2
Chapter 2	Heat Loss in Buildings	Module 2.1	S.I. Units	2.1	2.1	2.1	2.1	2.1
		Module 2.2	Heat transfer mechanisms	2.2	2.2	2.2	2.2	2.2
		Module 2.3	Fabric and Ventilation Heat Loss	2.3	2.3	2.3	2.3	2.3
Chapter 3	U-Values	Module 3.1	Introduction to U-values	3.1	3.1	3.1	3.1	3.1
		Module 3.2	Resistance of air layers / Surface Resistance	3.2	3.2	3.2	3.2	3.2
		Module 3.3	Calculation of U-values – Simple construction	3.3	3.3	3.3	3.3	3.3
		Module 3.4	Calculation of U-values – Thermal Bridging	3.4	3.4	3.4	3.4	3.4
		Module 3.5	Calculation of U-values – Concrete slab ground floor.	3.5	3.5	3.5	3.5	3.5
		Module 3.6	U-value of elements adjacent to an unheated space.	3.6	3.6	3.6	3.6	3.6
		Module 3.7	Thermal bridging.	3.7	3.7	3.7	3.7	3.7
		Module 3.8	Window U-value.	3.8	3.8	3.8	3.8	3.8
Chapter 4	Ventilation	Module 4.1	Airborne Pollutants	4.1	4.1	4.1	4.1	4.1
		Module 4.2	Infiltration	4.2	4.2	4.2	4.2	4.2
		Module 4.3	Ventilation Systems	4.3	4.3	4.3	4.3	4.3
Chapter 5	Space heating systems	Module 5.1	Space heating systems				5.1	5.1
		Module 5.2	Space heating system fuel types	5.2	5.2	5.2	5.2	5.2
		Module 5.3	Equipment operating efficiencies.	5.3	5.3	5.3	5.3	5.3
		Module 5.4	Standardised operation conditions.	5.4	5.4	5.4	5.4	5.4
		Module 5.5	Space heating system controls	5.5	5.5	5.5	5.5	5.5
		Module 5.6	District space heating	5.6	5.6	5.6	5.6	5.6
Chapter 6	Water heating systems	Module 6.1	Water heating systems				6.1	6.1
		Module 6.2	Water heating system fuel types				6.2	6.2
		Module 6.3	Standardised operation conditions.				6.3	6.3
		Module 6.4	Water heating systems losses				6.4	6.4
		Module 6.5	Water heating system controls				6.5	6.5
Chapter 7	Energy use.	Module 7.1	Energy use for space heating	7.1	7.1	7.1	7.1	7.1
		Module 7.2	Energy use for domestic hot water	7.2	7.2	7.2	7.2	7.2
		Module 7.3	Energy use for pumps	7.3	7.3	7.3	7.3	7.3
		Module 7.4	Energy use for fans	7.4	7.4	7.4	7.4	7.4
		Module 7.5	Energy use for lighting	7.5	7.5	7.5	7.5	7.5
Chapter 8	Solar gain	Module 8.1	Solar gain	8.1	8.1	8.1	8.1	8.1
Chapter 9	Renewable Energy Systems	Module 9.1	Solar thermal panels	10.1	10.1	10.1	10.1	10.1
		Module 9.2	Heat pumps	10.2	10.2	10.2	10.2	10.2
		Module 9.3	Bio-mass	10.3	10.3	10.3	10.3	10.3
		Module 9.4	Solar Photovoltaic panels	10.4	10.4	10.4	10.4	10.4
Chapter 10	Approved construction details	Module 10.1	Approved construction details	100%	100%	100%	25%	25%
Chapter 11	Passive House requirements	Module 11.1	Passive - on	11.1	11.1	11	11.1	11.1
Chapter 12	Improvement session	Module 12.1	Learner proposes improvements to a dwelling	12.1	12.1	12.1	12.1	12.1
Chapter 13	Behavioural change	Module 13.1	For a given dwelling suggest possible improvements.	13.1	13.1	13.1	13.1	13.1
Chapter 14	Structural Air Tightness	Module 14.1	Air leakage paths	14.1	14.4	14.1	14.1	14.1
		Module 14.2	Quantifying air leakage	14.2	14.2	14.2	14.2	14.2
		Module 14.3	Air pressurisation test	14.3	14.3	14.3	14.3	14.3
		Module 14.4	Air permeability standards	14.4	14.4	14.4	14.4	14.4
		Module 14.5	Air permeability of existing buildings	14.5	14.5	14.5	14.5	14.5
		Module 14.6	Improving air tightness	14.6	14.6	14.6	14.6	14.6
Chapter 15	Country specific legislation	Module 15.1	To be developed by individual countries	15.1	15.1	15.1	15.1	15.1
			For example Ireland - use TGD F, TDG L, TGD J SI 666, DEAP.					

Table 2: List of practical training

MODULE 3 U-Values

Visit thermal related bridging to passive house.
 Examples of thermal break to pass round (window manufacturers)
 Workshop for thermal break bridging with flow & RSJ.
 Examples of insulation to pass around (Example board of PRIMO)
 Model with different insulation materials and head-lamp above to show heat transfer

MODULE 4 Ventilation

Classroom airborne pollutants POC's Daily master
 Infiltration air leaks boiler test as example
 Stack effect site visit-a passive building.

MODULE 5 Space Heating Systems

District space heating visit
 Forms of heating under floor sealed system wet/dry system in institute
 Overview of system premier & secondary heating systems in institute
 Fuel types space heating system fossil fuel, renewables, biomass, heat pumps – all in institute
 Equipment operating efficiency in institute
 Operating conditions, comfort, Energy ASS PRO in institute
 Space heating & system controls in institute
 District heating overview potential visit off site

MODULE 6 Water Heating Systems

Standard operating system in institute
 Water heating system controls in institute

Module 7 Energy Use

Controls for space heating in institute
 Energy use for demo hot water in institute
 Pipe loss, Storage loss and vessels in institute
 Mechanical ventilation heat recovery in institute

MODULE 8 Solar Gain

Control impact of solar radiation by shading
 Ventilation windows and shrub overhangs in institute
 Triple glazing / double glazing examples

MODULE 10 Renewable Energy Systems

Installation of solar panels and PV on roof-model, scale 1:1

MODULE 12 Approves construction details

Use of PRIMO-modul to show build ups

MODULE 13 Passive House Requirements

Possible house trip

MODULE 14 Improvement session

Exercise – improvement of dwelling with gained knowledge

MODULE 16 Structural Air Tightness

Air tightness test on site

Air tightness test in workshop with smoke indicators and demonstration of effects of holes