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OERCO2 project

INTELLECTUAL OUTPUT 1

1.3.1. REPORT ON THE IMPLEMENTATION IN UNIVERSITIES, ARCHITECTURAL AND ENGINEERING, ETC.

ACADEMIC LEVEL



Consortium members: Universidad de Sevilla (US), Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM), CertiMaC Soc. Cons. a r. L. (CertiMaC), Centro Tecnologico da Ceramica e do Vidro (CTCV), Universitatea Transilvania din Brasov (UTBV), Asociatia Romania Green Building Council (RoGBC)





DESCRIPTION OF THE SURVEY

This report has been used as presentation of the survey's results of the OERCO2 project, as an integral part of the Intellectual Output 1 - Study of the methodology for calculation of CO2 of constructive processes and analysis of life cycle.

The purpose of this survey is to collect information from the respondents, who are related to different fields of construction. Surveys were used as a means of collecting information, in order to verify awareness of climate change and possible reduction of CO2 emissions in each academic level: students, professor and others.

A survey was given or sent to students and professors related to construction or environmental degrees. University of Seville and UTBV delivered the forms to its students of technical careers and also sent them by internal mail to students and teachers of construction subjects; CTM and CTCV sent to its network.

The total of collected forms had a total of 134, both online and handwritten filled forms. 22 of them, were professors, 109 were students and the remaining 3 attendants, others.

The feedback from experts' will be used to make a methodology to be applied for coming courses and contents. A special focus will be done in methodologies for calculating CO2 emissions from extraction of raw materials for the manufacture of building materials to reuse or disposal.





LANGUAGES OF QUESTIONNAIRES



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ENGLISH

LINKS

SURVEY AT ACADEMIC LEVEL

SURVEY AT ACADEMIC LEVEL

*Obligatorio

OERCO2. ONLINE EDUCATIONAL RESOURCE FOR INNOVATIVE STUDY OF CONSTRUCTION MATERIALS LIFE CICLE

The main objective of this project is to create an Open Educational Resource (OERCO2) where the calculations of CO2 emissions in each phase of the building are unified so that get an overall picture about footprint from the conception of it and decide on each variable of the construction.

Q0 Questionnaire supplied by: *

Universidad de Sevilla (US)	
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- Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM)
- CertiMaC Soc. Cons. a r. L. (CertiMaC)
- Centro Tecnologico da Ceramica e do Vidro (CTCV)
- Universitatea Transilvania Din Brasov (UTBV)
- Asociatia Romania Green Building Council (RoGBC)
- Otro:

Q1 What is your profession? *



nològico ay materiales





SPANISH

LINKS

ENCUESTA EN EL ÁMBITO ACADÉMICO

ENCUESTA EN EL ÁMBITO ACADÉMICO

*Obligatorio

OERCO2. CENTRO DE RECURSOS ONLINE PARA EL ESTUDIO INNOVADOR DEL CICLO DE VIDA DE LOS MATERIALES DE CONSTRUCCIÓN

Con este proyecto se pretende crear un recurso educativo de libre acceso (REA u Open Educational Resources -OER-) en la que se unifique el cálculo de todas las emisiones de CO2 en cada una de las fases del edificio para, así, tener una idea general de la huella de carbono del edificio desde la concepción del mismo y decidir sobre cada una de las variables de la edificación.

Q0 Encuesta facilitada por: *

- Universidad de Sevilla (US)
- Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM)
- CertiMaC Soc. Cons. a r. L. (CertiMaC)
- Centro Tecnologico da Ceramica e do Vidro (CTCV)
- Universitatea Transilvania Din Brasov (UTBV)
- Asociatia Romania Green Building Council (RoGBC)

Otro:

Q1 ¿Cuál es su profesión? *

Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.



LANGUAGES OF QUESTIONNAIRES



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ITALIAN

LINKS

QUESTIONARIO PER PERSONE APPARTENENTI AL MONDO ACCADEMICO

QUESTIONARIO PER I PROFESSIONISTI DEL SETTORE COSTRUZIONI

*Obligatorio

OERCO2. ONLINE EDUCATIONAL RESOURCE FOR INNOVATIVE STUDY OF CONSTRUCTION MATERIALS LIFE CICLE

The main objective of this project is to create an Open Educational Resource (OERCO2) where the calculations of CO2 emissions in each phase of the building are unified so that get an overall picture about footprint from the conception of it and decide on each variable of the construction.

Q0 Questionario fornito da: *

Universidad de Sevilla (US)

- Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM)
- CertiMaC Soc. Cons. a r. L. (CertiMaC)
- Centro Tecnologico da Ceramica e do Vidro (CTCV)
- Universitatea Transilvania Din Brasov (UTBV)

Asociatia Romania Green Building Council (RoGBC)

Otro:

Q1 Qual' è il tuo ruolo in un progetto? *







CTCV



PORTUGUESE

LINKS

INQUÉRITO A NÍVEL ACADÉMICO

INQUÉRITO A NÍVEL ACADÉMICO

*Obligatorio

OERCO2. RECURSOS EDUCATIVOS ONLINE PARA O ESTUDO INOVADOR DO CICLO DE VIDA DE MATERIAIS DE CONSTRUÇÃO.

O principal objetivo deste projeto é a criação de Recursos Educativos online (OERCO2) onde os caículos das emissões de CO2 em cada etapa do processo construtivo do edifício são unificados de forma a obter-se uma pegada global desse edifício desde a etapa de conceção, permitindo decidir sobre cada variável da construção.

Q0 Questionário fornecido por: *

Universidad de Sevilla (US)

 Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM)

CertiMaC Soc. Cons. a r. L. (CertiMaC)

Centro Tecnologico da Ceramica e do Vidro (CTCV)

Universitatea Transilvania Din Brasov (UTBV)

Asociatia Romania Green Building Council (RoGBC)

Otro:

Q1 Qual a sua profissão? *

Professor

Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.





Q0 Questionnaire supplied by:	%	No. Answers
Universidad de Sevilla (US)	38,06%	51
Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM)	15,67%	21
CertiMaC Soc. Cons. a r. L. (CertiMaC)	0,00%	0
Centro Tecnologico da Ceramica e do Vidro (CTCV)	4,48%	6
Universitatea Transilvania Din Brasov (UTBV)	41,04%	55
Asociatia Romania Green Building Council (RoGBC)	0,00%	0
Other	0,75%	1



Questionnaire supplied by:

- Universidad de Sevilla (US)
- Asociación Empresarial de Investigación Centro Tecnológico del Mármol, Piedra y Materiales (CTM)
- CertiMaC Soc. Cons. a r. L. (CertiMaC)
- Centro Tecnologico da Ceramica e do Vidro (CTCV)
- Universitatea Transilvania Din Brasov (UTBV)
- Asociatia Romania Green Building Council (RoGBC)
- Other



Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.





Q1 What is your profession?	%	No. Answers
Professor	16,42%	22
Student	81,34%	109
Other	2,24%	3





Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.





Q2 Degree	%	No. Answers
Architect	5,97%	8
Engineer	52,24%	70
Project Management	1,49%	2
Quantity Surveyor/Building Engineer	38,06%	51
Other	2,24%	3



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Universitatea

din Braşov



Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.





Q3 In which country do you study/work?	%	No. Answers
Spain	51,49%	69
Italy	2,99%	4
Portugal	4,48%	6
Romania	39,55%	53
Other	1,49%	2





Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.





Q4 How is the level of implementation on environmental aspects in your studies?		No. Answers
None	1,49%	2
Low	28,36%	38
Medium	51,49%	69
High	18,66%	25









Q5 About the following expertise areas, which of them it is possible to study in your university?	%	No. Answers
Energy Efficiency	26,72%	93
Environmental impact of materials	18,97%	66
Waste management	19,25%	67
Water management	8,05%	28
Environmental regulations	13,22%	46
Passive construction	13,22%	46
Other	0,57%	2

Expertise areas which is possible to study in your university:



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din Brasov







Q6 According to your degree, how much influence do you think that you have over the selection of materials and construction products on a typical project?		No. Answers
No influence	2,24%	3
Little influence	13,43%	18
Some influence	23,13%	31
Strong influence	49,25%	66
Primary influence	11,94%	16









Q7 Who do you believe has the greatest influence over material and construction product	No	Little	Some	Strong	Primary
selection on a typical project?	influence	influence	influence	influence	influence
Architect	3	12	33	65	21
Civil/structural engineer	3	19	37	40	35
Client	6	26	40	38	24
Contractor	14	27	57	25	11
M&E/services engineer	7	38	56	25	8
Urban Planner	15	35	42	33	9
Project manager	16	29	47	29	13
Quantity surveyor/Building engineer	12	20	43	36	23
Sustainability consultant	10	31	36	31	26
Developer	20	32	42	24	16
Public Servant/Regulations	24	36	32	28	14
Building Technical Control	17	28	51	26	12

Greatest influence over material and construction product selection on a typical project:



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	No	Little	Some	Strong	Primary
Q7 Who do you believe has the greatest influence over material and construction product	influence	influence	influence	influence	influence
selection on a typical project?	%	%	%	%	%
Architect	2,24%	8,96%	24,63%	48,51%	15,67%
Civil/structural engineer	2,24%	14,18%	27,61%	29,85%	26,12%
Client	4,48%	19,40%	29,85%	28,36%	17,91%
Contractor	10,45%	20,15%	42,54%	18,66%	8,21%
M&E/services engineer	5,22%	28,36%	41,79%	18,66%	5,97%
Urban Planner	11,19%	26,12%	31,34%	24,63%	6,72%
Project manager	11,94%	21,64%	35,07%	21,64%	9,70%
Quantity surveyor/Building engineer	8,96%	14,93%	32,09%	26,87%	17,16%
Sustainability consultant	7,46%	23,13%	26,87%	23,13%	19,40%
Developer	14,93%	23,88%	31,34%	17,91%	11,94%
Public Servant/Regulations	17,91%	26,87%	23,88%	20,90%	10,45%
Building Technical Control	12,69%	20,90%	38,06%	19,40%	8,96%

Greatest influence over material and construction product selection on a typical project:



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certificazione materiali per costruzioni

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Report 1.3.1. Level of implementation in universities, 13 architectural and engineering, etc.

Q8 What is your knowledge of the following materials and construction products?	Broad knowledge	Basic knowledge	Little or no knowledge of	
Brettstapel	9	58	67	
Cross Laminated Timber (CLT)	21	65	48	
Structural Insulated Panels (SIPs)	23	63	48	
Straw bale (either load bearing, infill or modular)	17	44	73	
Rammed earth	18	85	31	
Unfired brick	25	74	35	
Cob	13	49	72	
Adobe	26	76	32	
Hemp (including hemp-lime composites)	10	72	52	
Limecrete	20	50	64	
Cardboard (tubes or panels)	18	67	49	
Ethylene tetrafluoroethylene (ETFE)	16	42	76	
Inorganic Fibre Reinforced Polymers (FRP)	17	53	64	
Geopolymer concrete	10	59	65	
Concrete containing agricultural wastes (e.g. rice husks, vegetable fibres or nut shells)	21	59	54	
Concrete containing consumer wastes (e.g. plastics, glass or tyres)	24	47	63	
Concrete containing construction and demolition wastes	23	77	34	
Concrete containing industrial wastes (e.g. steel slag, sewage sludge ash, silica fume)	27	72	35	
Precast hollowcore floor slabs	29	72	33	
Optimised roll-out reinforcement meshes	30	57	47	
Recycled aggregates	35	78	21	
Recycled plastic lumber	19	58	57	
Reclaimed steel	27	70	37	
Reclaimed timber	24	75	35	



Knowledge of materials and construction products:



■ Broad knowledge ■ Basic knowledge ■ Little or no knowledge of

Q8 What is your knowledge of the following materials and construction products?	Broad knowledge	Basic knowledge	Little or no knowledge of
	%	%	%
Brettstapel	6,72%	43,28%	50,00%
Cross Laminated Timber (CLT)	15,67%	48,51%	35,82%
Structural Insulated Panels (SIPs)	17,16%	47,01%	35,82%
Straw bale (either load bearing, infill or modular)	12,69%	32,84%	54,48%
Rammed earth	13,43%	63,43%	23,13%
Unfired brick	18,66%	55,22%	26,12%
Cob	9,70%	36,57%	53,73%
Adobe	19,40%	56,72%	23,88%
Hemp (including hemp-lime composites)	7,46%	53,73%	38,81%
Limecrete	14,93%	37,31%	47,76%
Cardboard (tubes or panels)	13,43%	50,00%	36,57%
Ethylene tetrafluoroethylene (ETFE)	11,94%	31,34%	56,72%
Inorganic Fibre Reinforced Polymers (FRP)	12,69%	39,55%	47,76%
Geopolymer concrete	7,46%	44,03%	48,51%
Concrete containing agricultural wastes (e.g. rice husks, vegetable fibres or nut shells)	15,67%	44,03%	40,30%
Concrete containing consumer wastes (e.g. plastics, glass or tyres)	17,91%	35,07%	47,01%
Concrete containing construction and demolition wastes	17,16%	57,46%	25,37%
Concrete containing industrial wastes (e.g. steel slag, sewage sludge ash, silica fume)	20,15%	53,73%	26,12%
Precast hollowcore floor slabs	21,64%	53,73%	24,63%
Optimised roll-out reinforcement meshes	22,39%	42,54%	35,07%
Recycled aggregates	26,12%	58,21%	15,67%
Recycled plastic lumber	14,18%	43,28%	42,54%
Reclaimed steel	20,15%	52,24%	27,61%
Reclaimed timber	17,91%	55,97%	26,12%



Knowledge of materials and construction products:



Q9 For all materials for which 'Broad knowledge' is selected in Q8; In general aspects, which is reason you would choose to use these materials?	%	No. Answers
Low cost	13,49%	34
Client required it	12,70%	32
Architect, engineer or contractor required it	13,89%	35
Fits with company ethos	2,38%	6
Felt morally obliged to use low impact material	6 <i>,</i> 35%	16
Offered best structural performance	10,71%	27
Offered low operating costs	4,76%	12
Earned points towards assessment scheme (e.g. BREEAM, LEED)	9,52%	24
Reduced construction schedule	4,37%	11
Desirable aesthetics	3,97%	10
Improved 'health' of building	9,92%	25
Regulatory requirement	5,95%	15
Other	1,98%	5



Criteria to choose the materials selected in Q8:



Universitatea

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Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.

Q10 For all materials for which 'Broad knowledge or Basic knowledge' is selected in Q8. You stated that you have broad or basic knowledge of the mentioned materials. Which is reason you wouldn't choose to use these materials?	%	No. Answers
Not appropriate for type of projects I am typically engaged in	6,13%	13
Too costly	13,68%	29
Negative experiences of colleagues	5,19%	11
Negative perceptions held by clients	4,72%	10
Negative perceptions held by other project professionals	2,36%	5
Insufficient structural or thermal performance	6,60%	14
Concerns about durability	9,91%	21
Lack of technical knowledge or training	6,13%	13
Low availability of materials	10,38%	22
Low availability of skilled labour	11,32%	24
Too time consuming to design with	4,25%	9
Lack of established standards	4,72%	10
Lack of design guides and tools	3,30%	7
Lack of case studies or demonstration projects	2,36%	5
Insufficient fit with culture of clients	5,66%	12
Insurance issues	2,36%	5
Other	0,94%	2

Why have you chosen not to use the materials in Q8?



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Q11 Thinking more generally about alternative materials in construction, how important do you believe the following factors are in preventing their use?	Not at all important	Somewhat unimportan t	Somewhat important	Very important	Extremely important
High costs	3	6	29	54	42
Institutional culture and established practice	4	9	54	56	11
Insufficient design or performance information	2	11	46	53	22
Lack of design knowledge and skills	1	7	44	64	18
Shortage of skilled labour	2	15	39	54	24
Lack of regulation	3	19	38	47	27
Lack of demonstration projects	3	20	41	50	20
Time constraints	4	25	44	47	14
Bad press	10	36	42	33	13
Conservative nature of clients	6	17	34	51	26
Negative perceptions of industry	4	19	53	38	20

Importance of factors in relation to prevent the use of alternative materials in

constrution:



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ENEL CISTEC

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architectural and engineering, etc.



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del mármol, piedra y materiales



Q11 Thinking more generally about alternative materials in construction, how important do you believe the following factors are in preventing their use?		Somewhat unimportan t	Somewhat important	Very important	Extremely important
		%	%	%	%
High costs	2,24%	4,48%	21,64%	40,30%	31,34%
Institutional culture and established practice	2,99%	6,72%	40,30%	41,79%	8,21%
Insufficient design or performance information	1,49%	8,21%	34,33%	39,55%	16,42%
Lack of design knowledge and skills	0,75%	5,22%	32,84%	47,76%	13,43%
Shortage of skilled labour	1,49%	11,19%	29,10%	40,30%	17,91%
Lack of regulation	2,24%	14,18%	28,36%	35,07%	20,15%
Lack of demonstration projects	2,24%	14,93%	30,60%	37,31%	14,93%
Time constraints	2,99%	18,66%	32,84%	35,07%	10,45%
Bad press	7,46%	26,87%	31,34%	24,63%	9,70%
Conservative nature of clients	4,48%	12,69%	25,37%	38,06%	19,40%
Negative perceptions of industry	2,99%	14,18%	39,55%	28,36%	14,93%

Importance of factors in relation to prevent the use of alternative materials in constrution:



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Q12 How important do you believe the following developments could be in encouraging greater use of alternative materials and construction products?	Not at all important	Somewhat unimportan t	Somewhat important	Very important	Extremely important
Higher value in assessment schemes (e.g. BREEAM)	2	17	59	44	12
Regulation limiting embodied carbon in construction	1	9	42	59	23
Reductions in material cost		4	31	59	39
More environmentally conscious clients		7	45	48	34
More information on material performance and design	0	7	31	60	36
More demonstration projects and case studies	2	7	34	61	30
Training on designing with alternative materials	0	5	34	56	39

Importance of developments to encourage the use of alternative materials in construction:



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del mármol, piedra y materiales

20

architectural and engineering, etc.





Q12 How important do you believe the following developments could be in encouraging greater use of alternative materials and construction products?		Somewhat unimportan t	Somewhat important	Very important	Extremely important
	%	%	%	%	%
Higher value in assessment schemes (e.g. BREEAM)	1,49%	12,69%	44,03%	32,84%	8,96%
Regulation limiting embodied carbon in construction		6,72%	31,34%	44,03%	17,16%
Reductions in material cost	0,75%	2,99%	23,13%	44,03%	29,10%
More environmentally conscious clients	0,00%	5,22%	33,58%	35,82%	25,37%
More information on material performance and design		5,22%	23,13%	44,78%	26,87%
More demonstration projects and case studies	1,49%	5,22%	25,37%	45,52%	22,39%
Training on designing with alternative materials	0,00%	3,73%	25,37%	41,79%	29,10%

Importance of developments to encourage the use of alternative materials in construction:





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RESULTS OF THE SURVEY

At Academic level, the main results of the survey found:

	What is your profession?				
Q1	Student	Professor	Other		
	109	22	3		
	Degree				
Q2	Engineer	Building engineer	Architect		
	70	51	8		
	In which country do you study/	work?			
Q3	Spain	Other	Rest		
	69	53	6		
	How is the level of implementat	tion on environmental aspec	ts in your studies?		
Q4	Medium	High	Low		
	69	25	38		
	About the following expertise a	reas, which of them it is poss	ible to study in your		
	university?		Γ		
Q5	Water management	Energy efficiency	Environmental impacts of		
			materials		
	28	93	66		
	According to your degree, how	much influence do you think	that you have over the		
Q6	selection of materials and const	ruction products on a typica	I project?		
	Some influence	No influence	Little Influence		
	31	3	18		
Q/	Greatest influence over materia	l and construction product s	election on a typical project:		
	Archit	ect	Strong influence		
	Civil/structura	Il engineer	Strong influence		
	Clier	ıt	Some influence		
	Contra	ctor	Some influence		
	M&E/service	sengineer	Some influence		
	Urban Pl	anner	Some influence		
	Project ma	anager	Some influence		
	Quantity surveyor/E	Building engineer	Some influence		
	Sustainability	consultant	Some influence		
	Develo	per	Some influence		
	Public Servant/	Regulations	Little influence		
	Building Techn	ical Control	Some influence		
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_	certificazione materia	au per costruzioni			

COUNCIL

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 Almost half of respondents are engineers and consider that architects and civil/structural engineers have strong influence on the selection of materials.

Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.





RESULTS OF THE SURVEY

What is your knowledge of the following materials and construction products	5?
Brettstapel	Little or no knowledge
Cross Laminated Timber (CLT)	Basic knowledge
Structural Insulated Panels (SIPs)	Basic knowledge
Straw bale (either load bearing, infill or modular)	Little or no knowledge
Rammed earth	Basic knowledge
Unfired brick	Basic knowledge
Cob	Little or no knowledge
Adobe	Basic knowledge
Hemp (including hemp-lime composites)	Basic knowledge
Limecrete	Little or no knowledge
Cardboard (tubes or panels)	Basic knowledge
Ethylene tetrafluoroethylene (ETFE)	Little or no knowledge
Inorganic Fibre Reinforced Polymers (FRP)	Little or no knowledge
Geopolymer concrete	Little or no knowledge
Concrete containing agricultural wastes	Basic knowledge
Concrete containing consumer wastes	Little or no knowledge
Concrete containing construction and demolition wastes	Basic knowledge
Concrete containing industrial wastes	Basic knowledge
Precast hollowcore floor slabs	Basic knowledge
Optimised roll-out reinforcement meshes	Basic knowledge
Recycled aggregates	Basic knowledge
Recycled plastic lumber	Basic knowledge
Reclaimed steel	Basic knowledge
Reclaimed timber	Basic knowledge

Most respondents acknowledge having only basic or no knowledge of construction materials with ecological properties.







CTCV



Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.





RESULTS OF THE SURVEY

	For all materials for which 'Broa reason you would choose to us	d knowledge' is selected in C e these materials?	8; In general aspects, which is			
Q9	Architect, engineer or contractor required it	Low cost	Client required it			
	35	34	32			
	For all materials for which 'Broad knowledge or Basic knowledge' is selected in C stated that you have broad or basic knowledge of the mentioned materials. Wh reason you wouldn't choose to use these materials?					
Q10	Too costly	Low availability of skilled labour	Low availability of materials			
	29	24	22			
Q11	How important do you believe the following factors are in preventing their use?					
	High co	Very important				
	Institutional culture and	Very important				
	Insufficient design or per	Very important				
	Lack of design know	Very important				
	Shortage of sk	Very important				
	Lack of reg	gulation	Very important			
	Lack of demonstr	ation projects	Very important			
	Time cons	Very important				
	Bad pr	Somewhat important				
	Conservative nat	Very important				
	Negative percepti	Somewhat important				
OOE SEVILLA	Centro Tecnológico					

- They would choose these materials because architect, engineer, contractor or client required it or low cost.
- Most respondents consider that there are many factors that prevent further use of these materials.





RESULTS OF THE SURVEY

Q12	How important do you believe the following developments could be in encouraging greater use of alternative materials and construction products?					
	Higher value in assessment schemes (e.g. BREEAM)	Somewhat important				
	Regulation limiting embodied carbon in construction	Very important				
	Reductions in material cost	Very important				
	More environmentally conscious clients	Very important				
	More information on material performance and design	Very important				
	More demonstration projects and case studies	Very important				
	Training on designing with alternative materials	Very important				

Romania

BUILDING

COUNCIL

TRANSILVANIA

din Braso

GREEN

- Respondents think that it is very important more information about alternative materials to encourage the use of it.







MANY THANKS!



Report 1.3.1. Level of implementation in universities, architectural and engineering, etc.