

## QUESTIONNAIRE – SUPPLEMENTARY MATERIAL



### SELECTION OF LOW CARBON BUILDING MATERIALS IN CONSTRUCTION PROJECTS: CONSTRUCTION PROFESSIONAL'S PERSPECTIVE

**Dear Sir/Madam,**

The aim of this research is to study the construction sector perspective on low carbon building materials in Malaysia.

The questionnaire is based on THREE (3) sections:

**Section A:** Respondent Background

**Section B:** To study the awareness of the construction professionals on low carbon building materials selection.

**Section C:** To investigate the barriers preventing construction professionals from selecting a variety of low carbon building materials.

All information given will be kept with utmost confidentiality and it is for education purposes only. Your cooperation and time will be highly appreciated in completing this questionnaire.

Contact Information:

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**Section A: Respondent Background Instruction: Please (/) in the suitable boxes below.**

Q1. What is your gender?


Female

Male

Q2. What is your approximate age?


21-30

31-40

41-50

51-60

Above 60

Q3. What is your position in the firm?


Project manager

Professional engineer

Contractor

Construction site manager

Other

Q4. What is the highest degree of education you are studying or have completed?


PhD

Master Degree

Bachelor Degree

Diploma

Q5. What is the scope of your work?

<input type="checkbox"/>	Project planning and programming
<input type="checkbox"/>	Civil inspection engineer
<input type="checkbox"/>	Civil and environmental work
<input type="checkbox"/>	Infrastructure work
<input type="checkbox"/>	Civil and structural
<input type="checkbox"/>	Environmental
<input type="checkbox"/>	Safety and health
<input type="checkbox"/>	Project manager
<input type="checkbox"/>	Architectural
<input type="checkbox"/>	Project coordinator

Q6. How many years of experience (year) do you have in construction?

<input type="checkbox"/>	1-5 years
<input type="checkbox"/>	6-10 years
<input type="checkbox"/>	11-15 years
<input type="checkbox"/>	16-20 years
<input type="checkbox"/>	Above 20 years

Q7. What is grade of your company?

<input type="checkbox"/>	G6
<input type="checkbox"/>	G7
<input type="checkbox"/>	Not sure

## SECTION B: Construction Materials Selection

**Instruction:** The following that Likert Scale 1-5 are relevant to study the awareness of the construction professionals on low carbon building materials selection.

Least influential				Very influential
1	2	3	4	5

**Hence:** Based on your experience from your previous projects, please rate the following construction material selection.

Items	Construction Materials Selection	Least influential				Very influential
		1	2	3	4	5
<b>Q7</b>	<b>How much influence do you have over the selection of materials and construction Product on a project?</b>	1	2	3	4	5

Items	Construction Materials Selection	Least influential				Very influential
		1	2	3	4	5
<b>Q8</b>	<b>Generally, every constructions professional have their own responsible to select the Materials that is, directly and indirectly, minimize the embodied carbon emissions on a project. Please rank how much influence they have on the selection of construction materials based on your perspective.</b>					
A	Civil/ structure engineer	1	2	3	4	5
B	Sustainability consultant	1	2	3	4	5
C	Main/ sub-contractor	1	2	3	4	5
D	Main/ sub-contractor	1	2	3	4	5
E	Project manager	1	2	3	4	5
F	Quantity surveyor	1	2	3	4	5

G	Architect	1	2	3	4	5
H	Planner	1	2	3	4	5
I	Client	1	2	3	4	5
J	Other (Pls.Specify .....)	1	2	3	4	5

<b>Q9</b>	<b>What is your knowledge and understanding on the following materials and construction product?</b>					
A	Precast hollowcore slabs	1	2	3	4	5
B	Precast half slabs	1	2	3	4	5
C	Steel formwork system	1	2	3	4	5
D	Prefabricated timber frame system	1	2	3	4	5
E	Glue Laminated Timber (Glulam	1	2	3	4	5
F	Ground Granulated Blastfurnace Slag (GGBS)	1	2	3	4	5
G	Pulverised Fuel Ash (PFA)	1	2	3	4	5
H	Unfired brick	1	2	3	4	5
I	Ethylene Tetrafluoroethylene (ETFE)	1	2	3	4	5
J	Geopolymer concrete	1	2	3	4	5
K	Concrete containing construction wastes	1	2	3	4	5
L	Reclaimed steel	1	2	3	4	5
M	Cardboard	1	2	3	4	5
O	Bamboo	1	2	3	4	5

<b>Q10</b>	<b>What is your frequency of use these materials?</b>					
A	Precast hollowcore slabs	1	2	3	4	5
B	Precast half slabs	1	2	3	4	5
C	Steel formwork system	1	2	3	4	5
D	Prefabricated timber frame system	1	2	3	4	5
E	Glue Laminated Timber (Glulam	1	2	3	4	5

F	Ground Granulated Blastfurnace Slag (GGBS)	1	2	3	4	5
G	Pulverised Fuel Ash (PFA)	1	2	3	4	5
H	Unfired brick	1	2	3	4	5
I	Ethylene Tetrafluoroethylene (ETFE)	1	2	3	4	5
J	Geopolymer concrete	1	2	3	4	5
K	Concrete containing construction wastes	1	2	3	4	5
L	Reclaimed steel	1	2	3	4	5
M	Cardboard	1	2	3	4	5
O	Bamboo	1	2	3	4	5

<b>Q11</b>	<b>Throughout your experience in construction field, how often have you used these materials?</b>					
A	Precast hollowcore slabs	1	2	3	4	5
B	Precast half slabs	1	2	3	4	5
C	Steel formwork system	1	2	3	4	5
D	Prefabricated timber frame system	1	2	3	4	5
E	Glue Laminated Timber (Glulam)	1	2	3	4	5
F	Ground Granulated Blastfurnace Slag (GGBS)	1	2	3	4	5
G	Pulverised Fuel Ash (PFA)	1	2	3	4	5
H	Unfired brick	1	2	3	4	5
I	Ethylene Tetrafluoroethylene (ETFE)	1	2	3	4	5
J	Geopolymer concrete	1	2	3	4	5
K	Concrete containing construction wastes	1	2	3	4	5
L	Reclaimed steel	1	2	3	4	5
M	Cardboard	1	2	3	4	5
O	Bamboo	1	2	3	4	5

<b>Q12</b>	<b>Thinking about the projects on which you used these low carbon materials. Why did you choose to use each material?</b>					
A	Felt morally obliged to use low carbon materials	1	2	3	4	5
B	Earned points towards assessment scheme	1	2	3	4	5
C	Architect, engineer or contractor required it	1	2	3	4	5
D	Client required it	1	2	3	4	5
E	Offered best structural performance	1	2	3	4	5
F	Desirable aesthetics	1	2	3	4	5
G	Fits with company ethos	1	2	3	4	5
H	The materials more economic	1	2	3	4	5
I	Save time of construction progress	1	2	3	4	5
K	Save operation cost of construction project	1	2	3	4	5
L	Often looking for new technology/innovation	1	2	3	4	5
M	Improved health and safety during construction progress	1	2	3	4	5
N	Regulatory requirement	1	2	3	4	5

<b>Q13</b>	<b>How important do you believe the following developments could be in encouraging greater use of alternative materials and construction products that emit low amount of carbon?</b>					
A	Regulation limiting embodied carbon	1	2	3	4	5
B	Reductions in low carbon materials cost	1	2	3	4	5
C	More information on material performance and design	1	2	3	4	5
D	More environmentally conscious construction professionals	1	2	3	4	5
E	Training on designing with alternative materials	1	2	3	4	5
F	More demonstration projects and case studies	1	2	3	4	5
G	Higher value in assessment schemes	1	2	3	4	5

### SECTION C: Barriers of Materials Selection.

**Instruction:** The following that Likert Scale 1-5 are relevant to investigate the barriers preventing construction professionals from selecting a variety of low carbon building materials.

Not important	Least important	important	Very important	Extremely important
1	2	3	4	5

**Hence:** Based on your experience from your previous projects, please rate the following Barriers of materials section

Items	Barriers of Materials Selection	Not important	Least Important	Important	Very important	Extremely important
		1	2	3	4	5
<b>Q14</b>	<b>Thinking more generally about alternative materials in construction, how important do you believe the following factors are in preventing their use?</b>					
A	Institutional culture and established practice	1	2	3	4	5
B	Insufficient design or performance information	1	2	3	4	5
C	Lack of design knowledge and skills	1	2	3	4	5
D	Lack of knowledge on Life Cycle Assessment	1	2	3	4	5
E	Conservative nature of clients	1	2	3	4	5
F	Negative perceptions of industry	1	2	3	4	5
G	Lack of demonstration projects	1	2	3	4	5
H	Shortage of skilled labour	1	2	3	4	5
J	Time constraints	1	2	3	4	5
K	Bad press	1	2	3	4	5
L	High costs	1	2	3	4	5
M	Lack of regulation	1	2	3	4	5

**Q14.** Through your experience, what else are the barriers other than listed in the table above?

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