Construcción

SAMCEW©: Sustainable Assessment Method for Civil Engineering Works

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SAMCEW©: Sustainable Assessment Method for Civil Engineering Works

Construcción

Introduction

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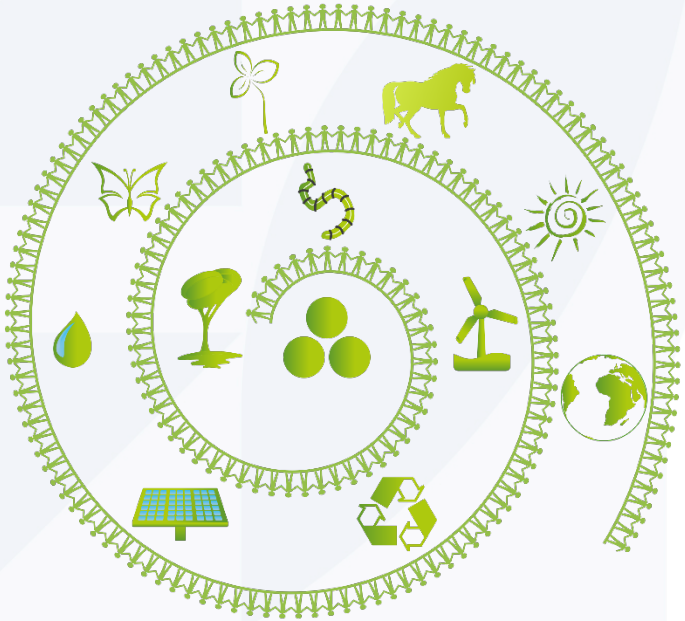
Introduction

FCC Construcción's commitment

FCC Construcción's **Environmental Management System** is certified according to ISO 14001:2015 in all the countries where construction projects are developed.

FCC Construcción has implemented a **System of Environmental Good Practices**:

- Set of environmental and social practices in all our projects.
- Specific requirement of the company with greater demands than those required by law or by the client.
- The score obtained is an indicator of the environmental and social performance of the undertaken projects.



Introduction

FCC Construcción's commitment

FCC Construcción holds the presidency of the following Working Groups:

- ISO/TC59/SC17/WG5
- CEN/TC350/WG6

Both groups are working on the **elaboration of frameworks** intended to give guidelines for the assessment of sustainability in civil engineering works.

Introduction

Aim of the project

There are not many assessment methods for civil engineering works as there are for buildings.

FCC Construcción has developed an internal **S**ustainability **A**ssessment **M**ethod for **C**ivil **E**ngineering **W**orks **(SAMCEW©)**.

Based on internationally recognised methods:

- Work undertaken with international civil engineers in ISO and CEN working groups.
- Experience with the application of the Sustainable Management System at our worksites.
- Other international methodologies.

Introduction

Aim of the project

- SAMCEW© is a **self-assessment rating system**:
  - Internal management programme to:
    - Plan the construction work
    - Identify needed improvements
  - Enables designers and managers to:
    - Share advances in sustainable practices
    - Demonstrate the sustainable credentials of their project to clients, planners and other interested parties

Introduction
Aim of the project

- **SAMCEW©** covers the three-pillar model of sustainable development.
- This model includes the environmental, social and economic dimensions and seeks to achieve a balance among them.

SAMCEW©: Sustainable Assessment Method for Civil Engineering Works

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Methodology

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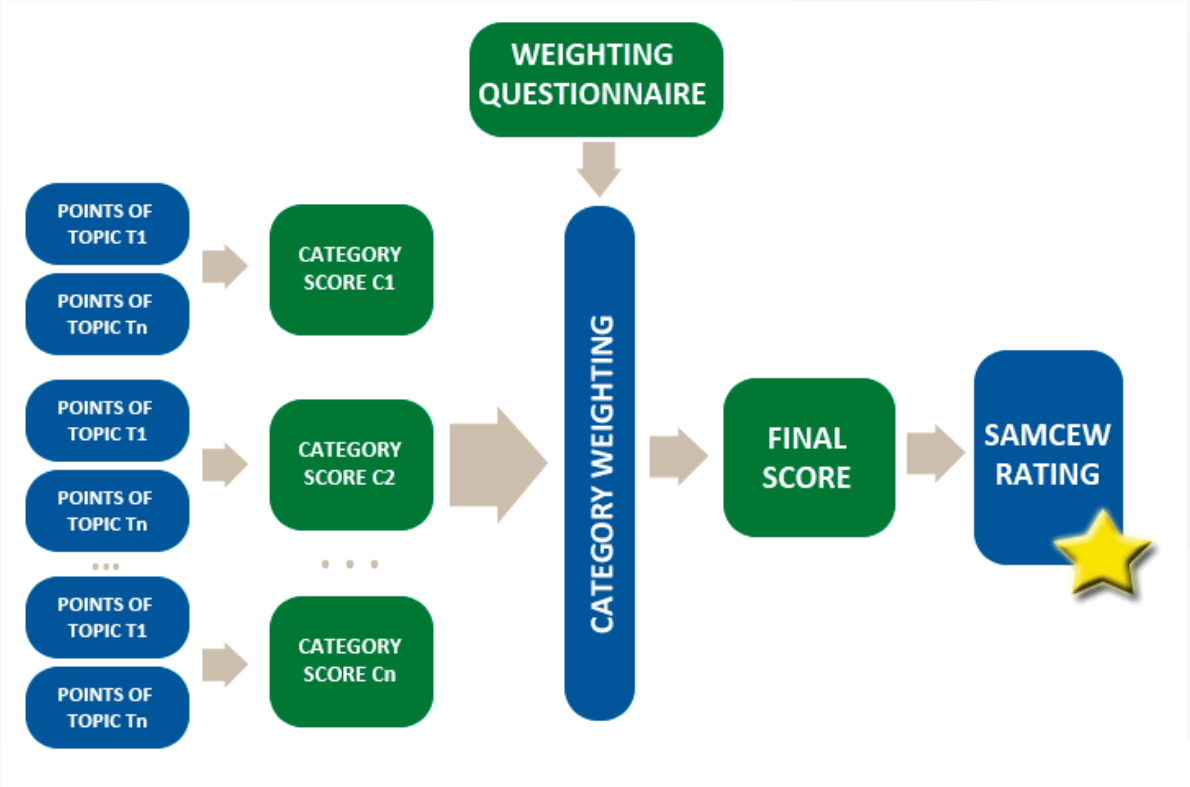
Methodology

SAMCEW© Structure

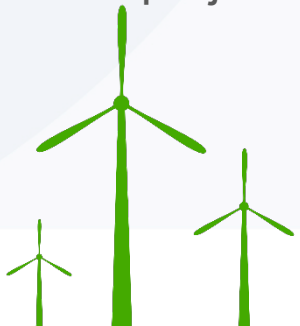


Methodology
Weighting system

- SAMCEW© is a ***flexible and customizable*** assessment methodology.
- Depending on:
  - Type of civil engineering works
  - Specific location
  - Project characteristics
  - Stage assessed

Certain aspects will be more important than others, regarding the sustainable performance of the project.

- The **relative importance** of each category is established for each project according to its specific circumstances.
  - It is necessary to answer an initial set of questions.
  - The answers to this questionnaire will define the weighting system of the project.



Methodology

Typology of civil engineering works

Industrial processes infrastructures

Dams and other fluvial works

Linear infrastructures

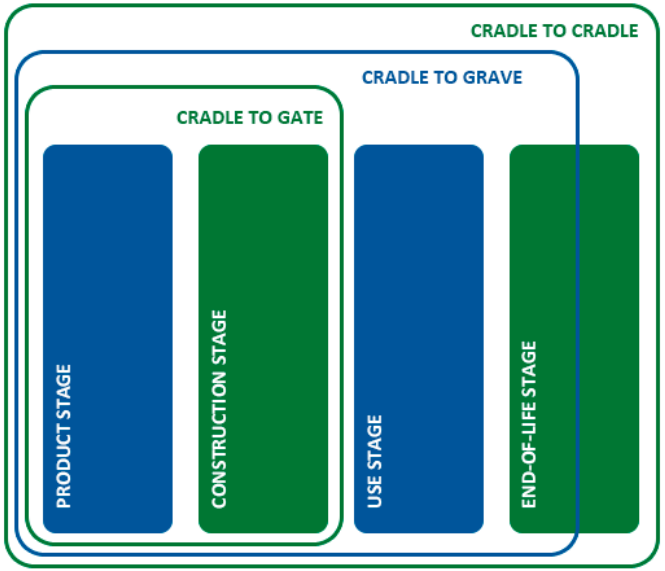
Maritime works

Other civil engineering works: earthworks, landfill, public realm works, etc.

Methodology

Life Cycle Stages

SAMCEW can be applied at the different life cycle stages of a civil engineering works:



- **Product stage:** considers the period from the extraction of material to the factory, “from cradle to gate”.
- **Construction stage:** considers the period between the point of time when construction work start and the point when the civil engineering works is ready to be used and the transportation of products to the site. (Planning, design and procurement stages included).
- **Use stage:** considers the period in which the civil engineering works is used or gives its service to the community.
- **End-of-life stage:** considers all the stages that occur during the end-of-life process.

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Categories

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SAMCEW©

Categories

SAMCEW© is organised into 15 categories. These categories consider significant issues developed throughout the project within the three dimensions of sustainability.

Categories

PROJECT MANAGEMENT

- Strategy for the project
- Commitment of sub-contractors, suppliers and clients
- Training

LAND PLANNING

- Land use change
- Land use efficiency

LIFE CYCLE COSTS

- Purchase costs
- Professional fees
- Works costs
- Bureaucratic costs
- Operation and maintenance costs
- Deconstruction costs
- Income

EXTERNAL COSTS

- Construction-related user costs
- Environmental damage costs

EFFECTS ON LOCAL ECONOMY

- Job creation
- Population system

Categories

PARTICIPATION AND ACCEPTABILITY

- Consultation and communication
- Acceptability and engagement
- Necessity/urgency of the project

CULTURAL HERITAGE ELEMENTS

- Cultural heritage baseline study
- Public information
- Conservation and enhancement

WELFARE

- Safety and rights of workers
- Health and comfort
- Accessibility
- Adaptability

EFFECTS ON SOCIETY

- Effects on transport network
- Loadings on the surroundings

RISK AND RESILIENCE

- Adaptation and vulnerability to climate change
- Safety and security

Categories

ECOSYSTEMS AND BIODIVERSITY	USE OF NATURAL RESOURCES	WASTE	EMISSIONS TO THE ENVIRONMENT	NOISE AND VIBRATIONS
• Ecosystems • Flora and fauna • Landscape (visual impacts)	• Energy • Materials • Water	• Waste prevention • Management	• Air • Water • Soil • Lighting	

SAMCEW©: Sustainable Assessment Method for Civil Engineering Works

Construcción

SAMCEW©Application

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SAMCEW© Application

Instructions

Construcción

SAMCEW

INSTRUCTIONS

The Sustainability Assessment Method for Civil Engineering Works (**SAMCEW**) has the purpose of assessing the sustainability of all civil engineering works and its area of influence.

SAMCEW is a self-assessment rating system that serves as an internal management programme to plan the construction work, identify needed improvements and share advances in sustainable practices.

1. Weighting System

On the worksheet "Weighting System", choose the type of the civil engineering works that is going to be assessed with **SAMCEW.** Select also the life cycle stages that are going to be assessed. At any time the selected stages can be changed in this worksheet.

Once these two sections have been answered, please fill the cells marked with blue of the weighting questionnaire by selecting "Yes" or "No".

By answering these questions, each category obtains a weight, expressed in percentage. This result will be used to calculate the **SAMCEW** Rating.

2. Categories

Please answer the questions included in each of the worksheets marked in green to assess the 15 categories of **SAMCEW.** For this task, select the option that fits better with the project from the dropdown list or enter the data required. Some categories, topics and concepts have un-scored prerequisites that must be met in order to score.

The columns of the life cycle stages not selected on the worksheet "Weighting System" will appear as non-applicable (red cells) and, consequently, they will not be considered in the final results.

3. Rating

The worksheet "Rating" shows the results for each life cycle stage individually, considering the category weight obtained at the beginning of the method. The graphic displays which stage contributes most to sustainability and the relative importance of each dimension (economic, social and environmental).

Instructions | W.S. | Pr.Man | 2 L.Pl | 3 LCC | 4 Ex.Cost | 5 L.Ec | 6 P&Acc | 7 Cult.Her | 8 Welfare | 9 Soc | 10 R&R | 11 Ec&Bi | 12 Res | 13 Waste | 14 Emis | 15 N&V | Rating

SAMCEW Application guides the user during the implementation of the methodology.

Structured in three sections:

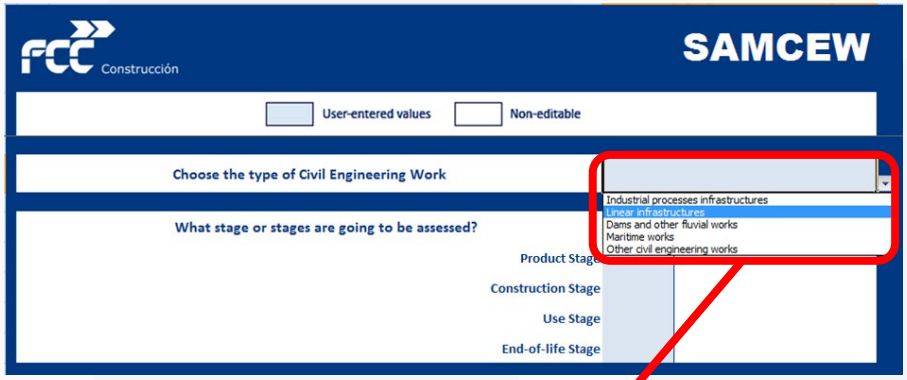
- Weighting System
- Categories
- Rating

SAMCEW© Application

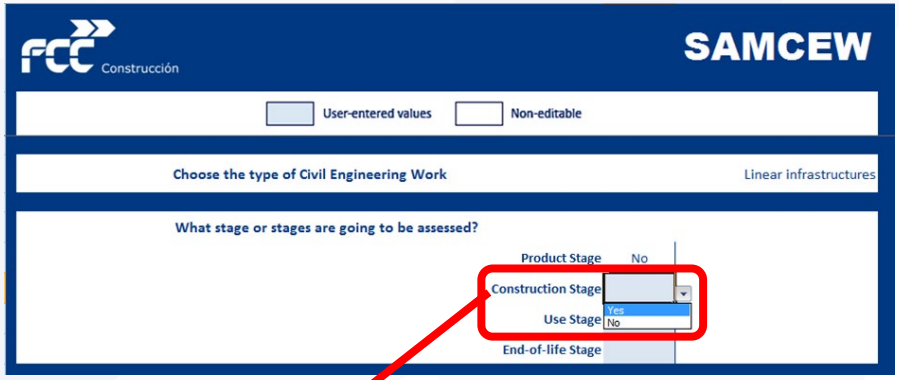
Weighting system

The worksheet ***"Weighting System"*** allows the user:

- ✓ to choose the **type of civil engineering works** that is going to be assessed.
- ✓ to select the **life cycle stages** that are going to be assessed.
- ✓ to answer a **weighting questionnaire**. According to the specific answers and circumstances of the project, each of the 15 categories obtains a weight expressed in %



Choose the type of civil engineering works



Choose the assessed stage

SAMCEW© Application

Guidance

- In addition to the application, a **manual** has been developed.
- It provides guidance on answering categories' questions.

Long-term unemployed				
Available points	Product Stage	Construction Stage	Use Stage	End-of-life Stage
		3	3	3

Objective/Aim	
Prioritise inclusion of long-term unemployed people in the labour market.	
Does the hiring process for job offers at the civil engineering works consider the time that candidates have spent in unemployment? Score one point for each of the cases accomplished.	
1 point	This requisite will be formally communicated to the Human Resources Department of the main contractor (FCC CONSTRUCCIÓN) and/or to public employment services.
1 point	Long-term unemployed candidates are or will be positively evaluated during the hiring process.
1 point	There is a commitment that more than 20% of the hired workers are long-term unemployed.

Instructions	
	$Long-term\ unemployed\ \% = \frac{Number\ of\ hired\ workers\ unemployed > 1\ year}{Number\ of\ hired\ workers} \cdot 100$ Long-term unemployed workers: workers which were unemployed during more than one year. Workers hired by sub-contractors are not considered. Number of hired workers: employees directly hired by the main contractor (FCC CONSTRUCCIÓN) for the assessed stage. Workers hired by sub-contractors are not considered. **Scope-out:** when the sub-contractors are in charge of the recruitment.
Documentation required	When scoring the point related to the recruitment commitment, it is necessary to provide the data used for the calculation as evidence.

SAMCEW© Application

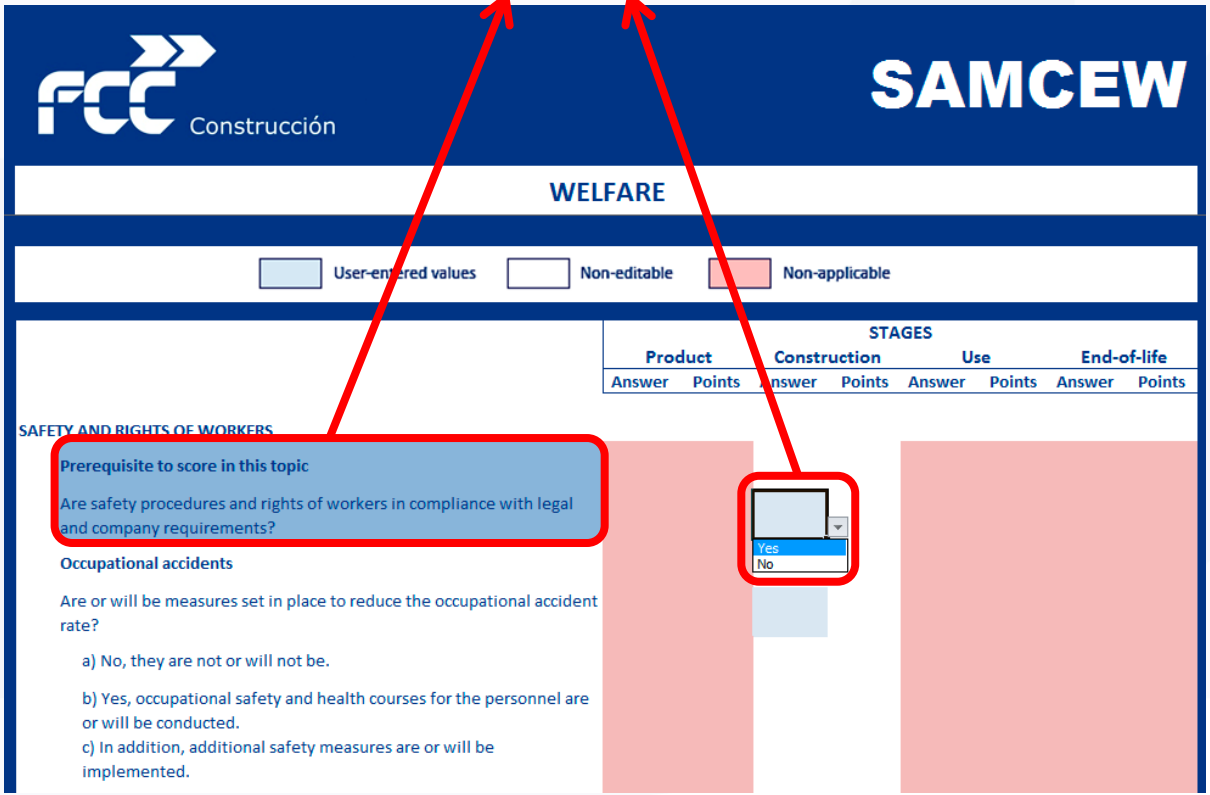
Categories

- Considerations when answering the categories' questions:
  - ✓ Only the stages selected in the worksheet "Weighting system" are available to answer.
  - ✓ Non-selected stages or questions that do not apply for the stage appear in red and are non-available.
  - ✓ The user enters the answers in the blue cells.
  - ✓ Points are scored depending on the answer given.
  - ✓ Some questions are prerequisites that must be met to score in the category, topic or concept.
  - ✓ Some questions can be scoped-out if the criteria specified in the guidelines are met by the project's characteristics.

SAMCEW© Application

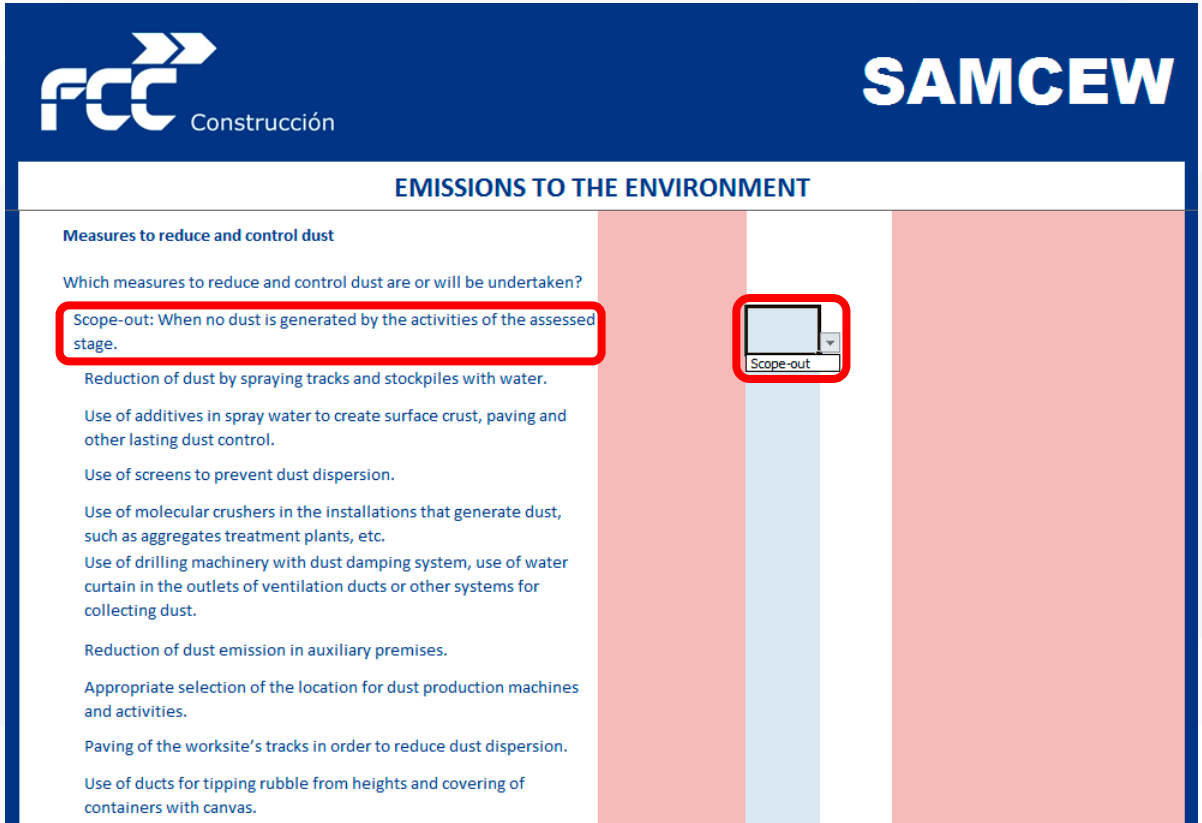
Categories

Prerequisites must be met to score in the category, topic or concept



SAMCEW© Application

Categories



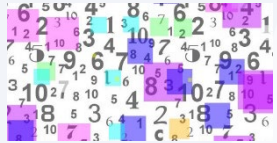
Some questions may not apply if specific criteria are met by the project. In this case, the question can be scoped-out.

SAMCEW© Application

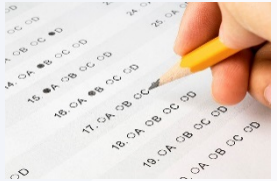
Categories

SAMCEW© method has three types of questions:

- **Data questions**: the user enters the requested data in the blue cells.



- **Multiple-choice questions**: the user chooses only one option from the possible answers.

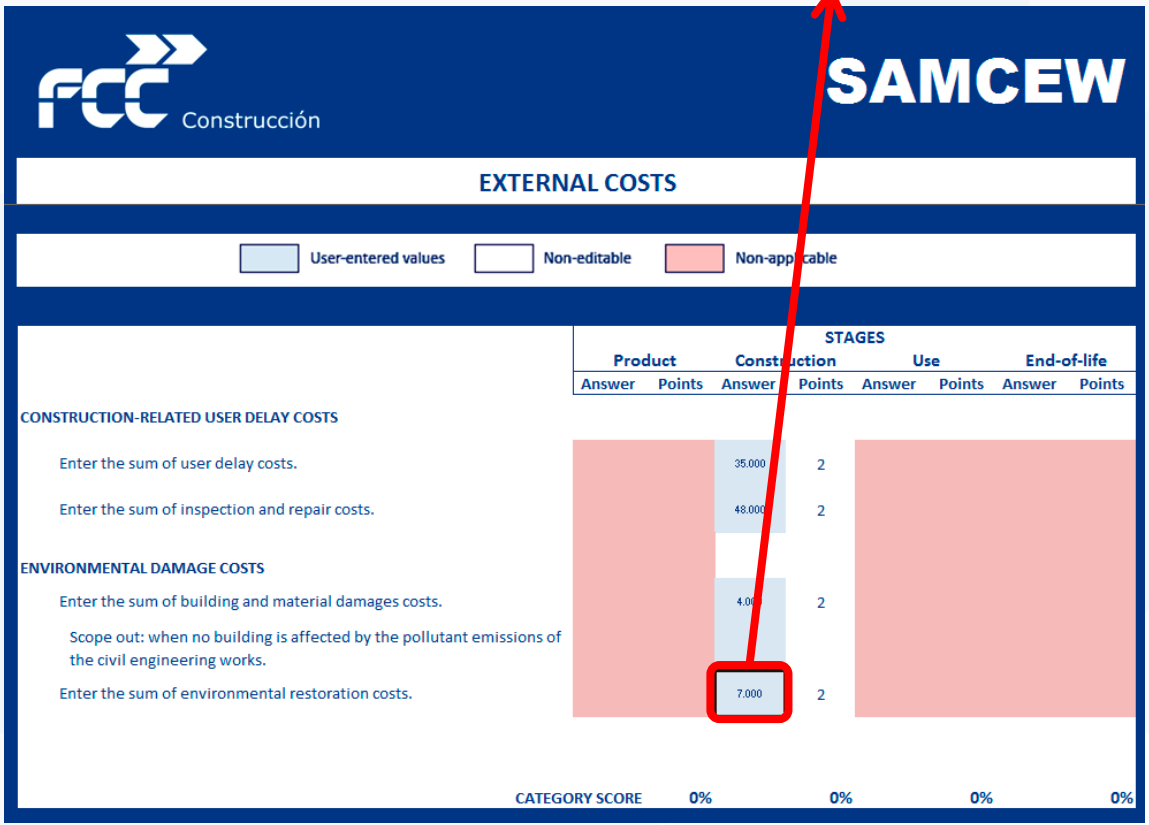


- **Yes/No questions**: the user can choose more than one option by answering “Yes” or “No” to the alternatives given.

SAMCEW© Application

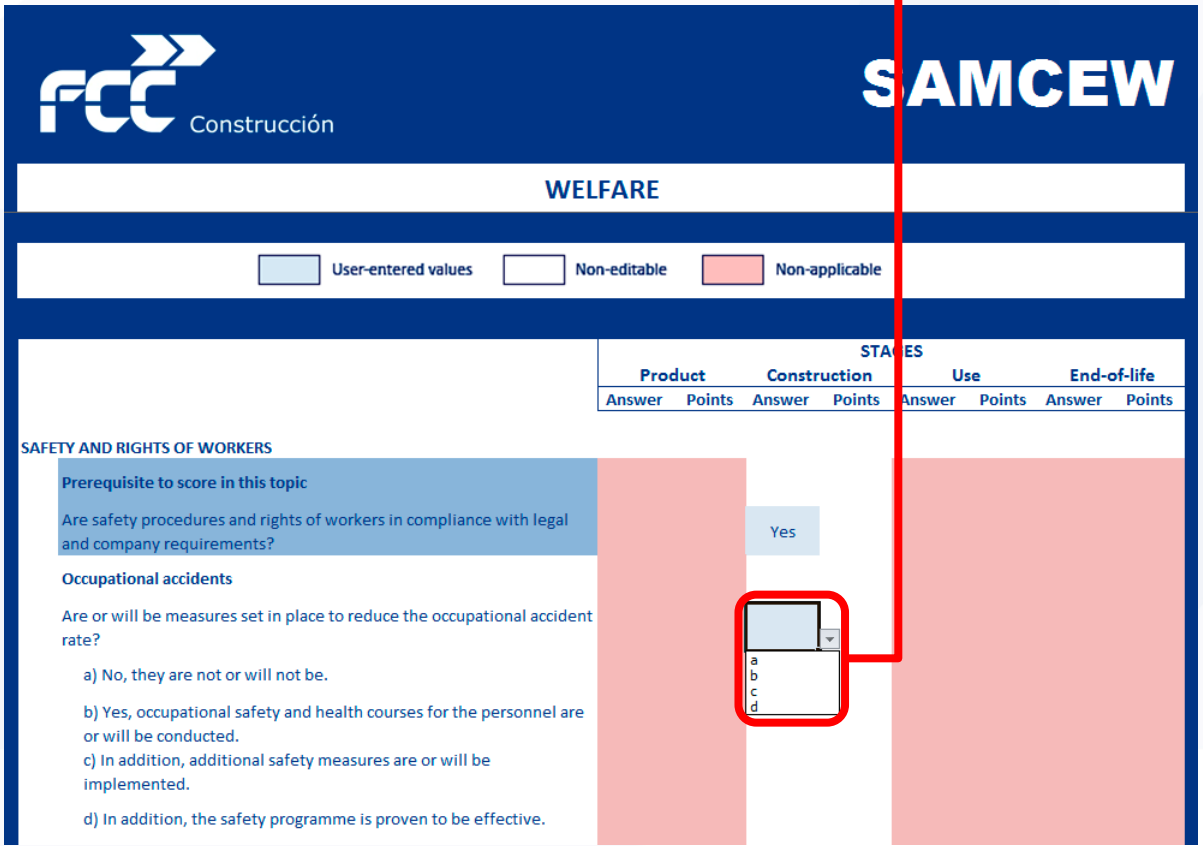
Categories

Enter the requested data in the blue cells



SAMCEW© Application

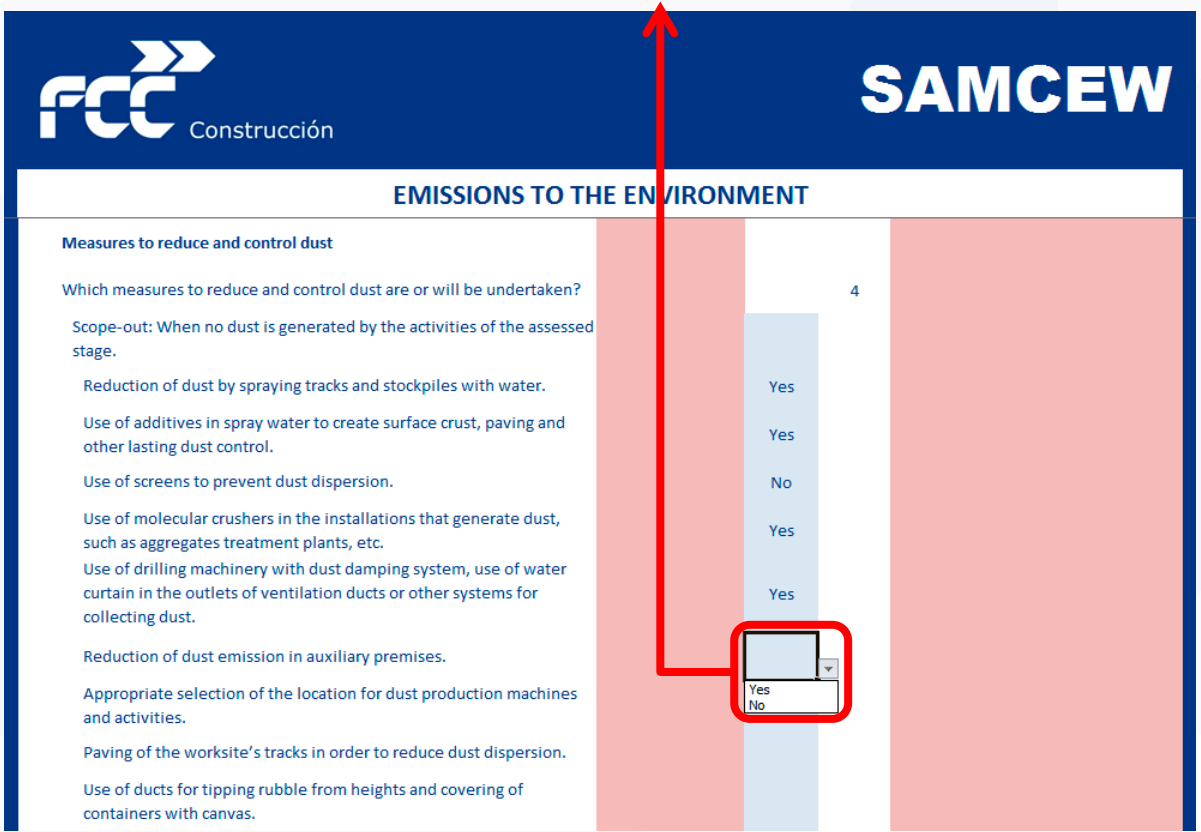
Categories



SAMCEW© Application

Categories

Answer “Yes” when true



SAMCEW© Application

Rating

The worksheet *"Rating"* shows the results for each life cycle stage, considering the category weight and the category score.

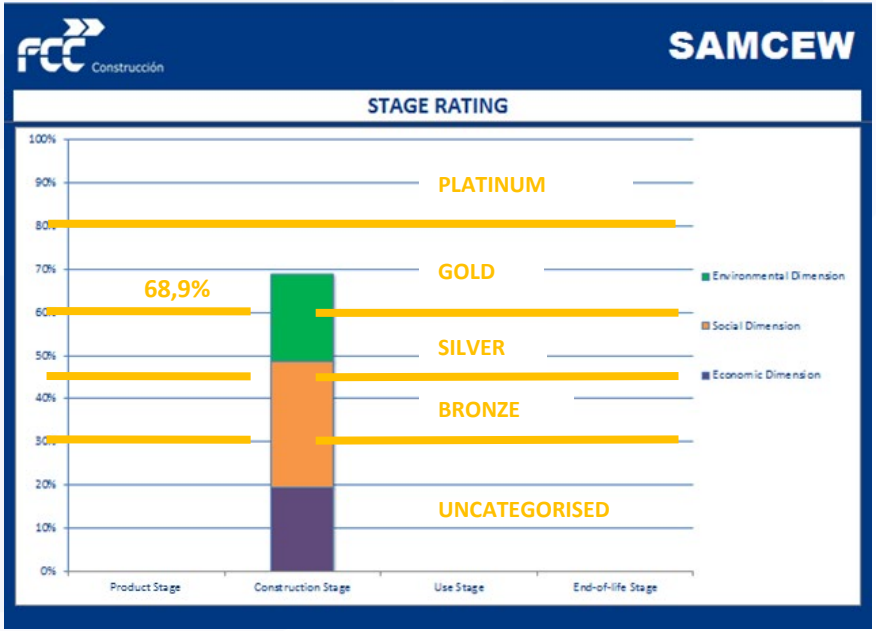
SAMCEW

STAGE RATING

< 30% UNCATEGORISED 30 - 45% BRONZE 46 - 60% SILVER 61 - 80% GOLD > 80% PLATINUM		Category Weight	Product Stage		Construction Stage		Use Stage		End-of-life Stage	
					GOLD					
			Category Score	Final Score	Category Score	Final Score	Category Score	Final Score	Category Score	Final Score
1	Project management	8,4%			56,3%	4,8%				
2	Land planning	6,1%			46,2%	2,8%				
3	Life Cycle Costs	4,4%			90,0%	3,9%				
4	External costs	3,0%			75,0%	2,3%				
5	Effects on local economy	8,0%			72,2%	5,8%				
6	Participation and acceptability	6,6%			63,8%	4,2%				
7	Cultural heritage	7,5%			87,1%	6,5%				
8	Welfare	8,6%			79,4%	6,8%				
9	Effects on society	8,7%			70,7%	6,2%				
10	Risk and resilience	6,4%			86,4%	5,5%				
11	Ecosystem and biodiversity	7,6%			72,6%	5,5%				
12	Use of natural resources	10,4%			59,7%	6,2%				
13	Waste	4,3%			54,4%	2,3%				
14	Emissions to the environment	5,1%			67,2%	3,4%				
15	Noise and vibrations	4,9%			54,5%	2,7%				
	Stage score					68,9%				

Stage Rating

<30% UNCATEGORISED
30 – 45% BRONZE
46 – 60% SILVER
61 – 80% GOLD
>80% PLATINUM



Construcción

We are creating eco-efficient communities

FCC Construcción
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