MaS-SHIP
Mainstreaming Sustainable Social Housing in India Project

Sustainability Assessment Tool (SAT)
October 2018

User guide

The Sustainability Assessment Tool (SAT) is built on a Multi-Criteria Decision support system to provide the targeted beneficiaries with evidence-based performance information. This would aid decision making w.r.t the choice of building materials and construction technologies, (walling and roofing), for social housing projects in India.

A total of 17 building materials and technologies have been evaluated on the basis of 18 attributes categorized under four main criteria – *Resource Efficiency, Operational Performance, User Experience and Economic Impacts.*

Overview of SAT

To evaluate the sustainability performance of building materials and technologies, 18 attributes have been identified (Figure 1) and detailed in the note on 'Attributes for selecting sustainable building materials and technologies.
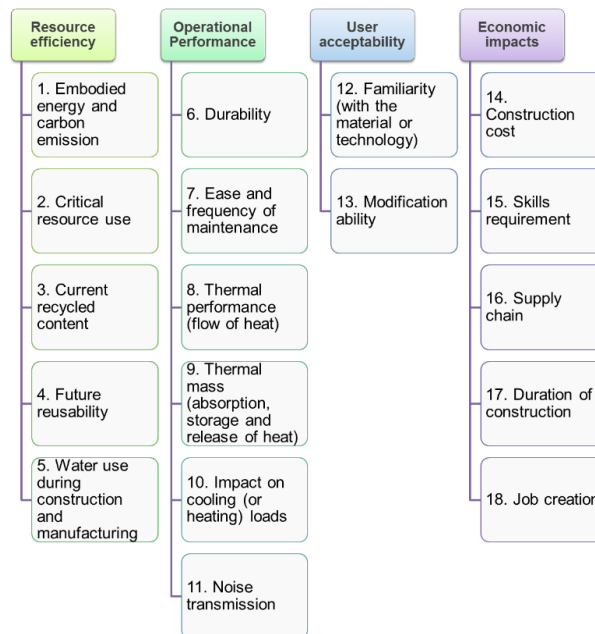

Figure 1: Attributes comprising the SAT

About 17 sustainable building materials and technologies, consisting of both existing and emerging technologies have been assessed against these 18 attributes. Both, primary and secondary data collection methods were applied to collect quantitative and qualitative data for each of the 18 attributes. The SAT evaluation methodology is designed to mathematically account for the missing data for building materials and technologies and does not assume it to be zero. Currently the methodology is effective for application to housing constructions upto G+4 only.

Outputs

The SAT enables the user to make an informed choice by providing:

- Order of preference of 17 walling & roofing building technologies across all 18 attributes
- Order of preference of 17 walling & roofing building technologies across selected attributes
- Customized results based on the location selected

The SAT outputs are represented in the form of graphs which provide 'scores' of the building materials and technologies with respect to the selected attributes. The scores have been calculated on the basis of absolute data gathered for 17 building materials and technologies across 18 weighted attributes.The weights of the attributes are based on an AHP survey conducted among relevant industry experts. A total of 184 responses were gathered from the AHP survey.

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The SAT graphs are displayed to inform the user about the relative performace of the building materials and technolgies below each main criteron - *Resource Efficiency, Operational Performance, User Experience and Economic Impacts.*
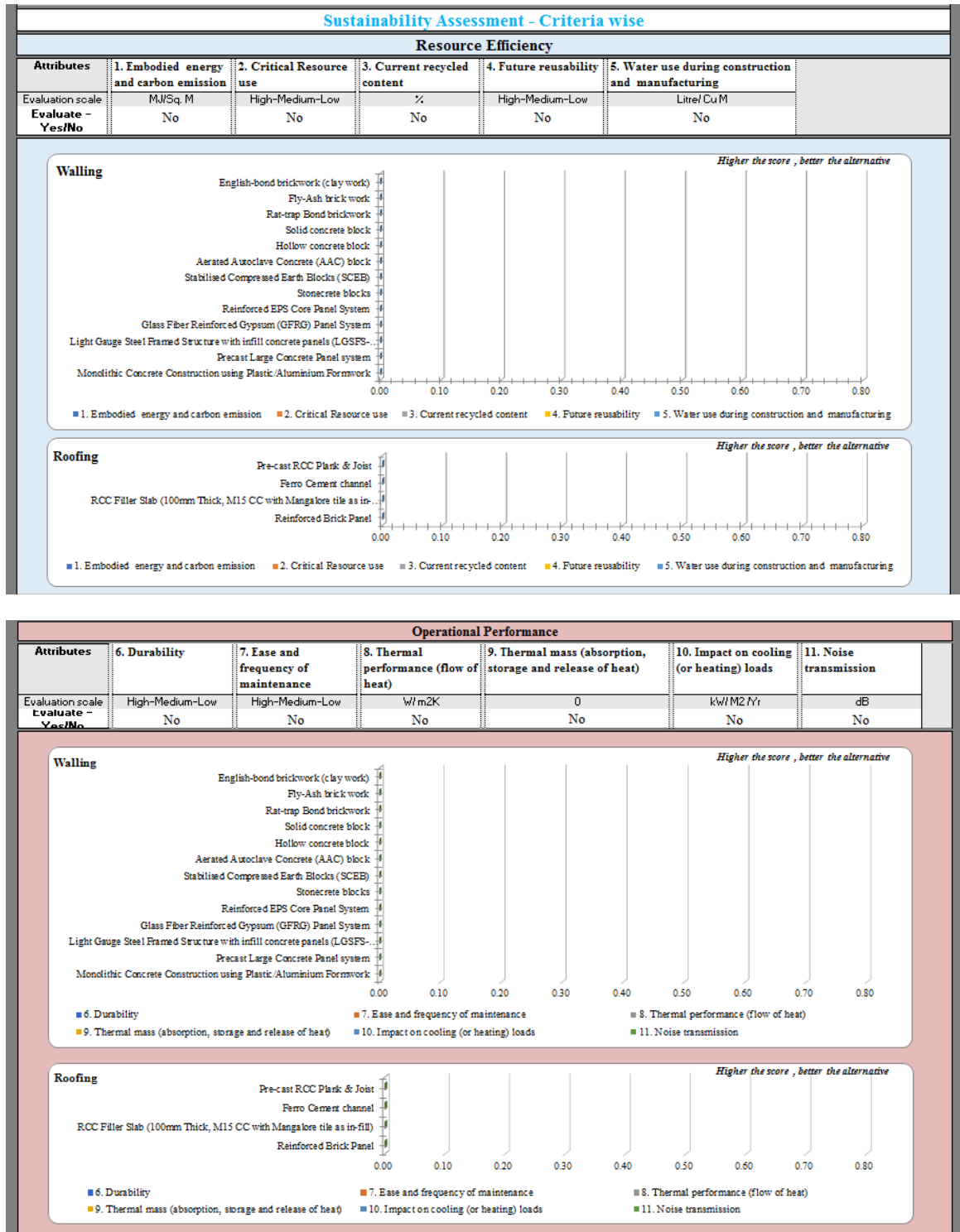

Figure 2: SAT graphs for each main criterion

A holistic score across all selected attributes is also displayed towards the bottom of the SAT under 'Sustainability Assessment – Holistic'.
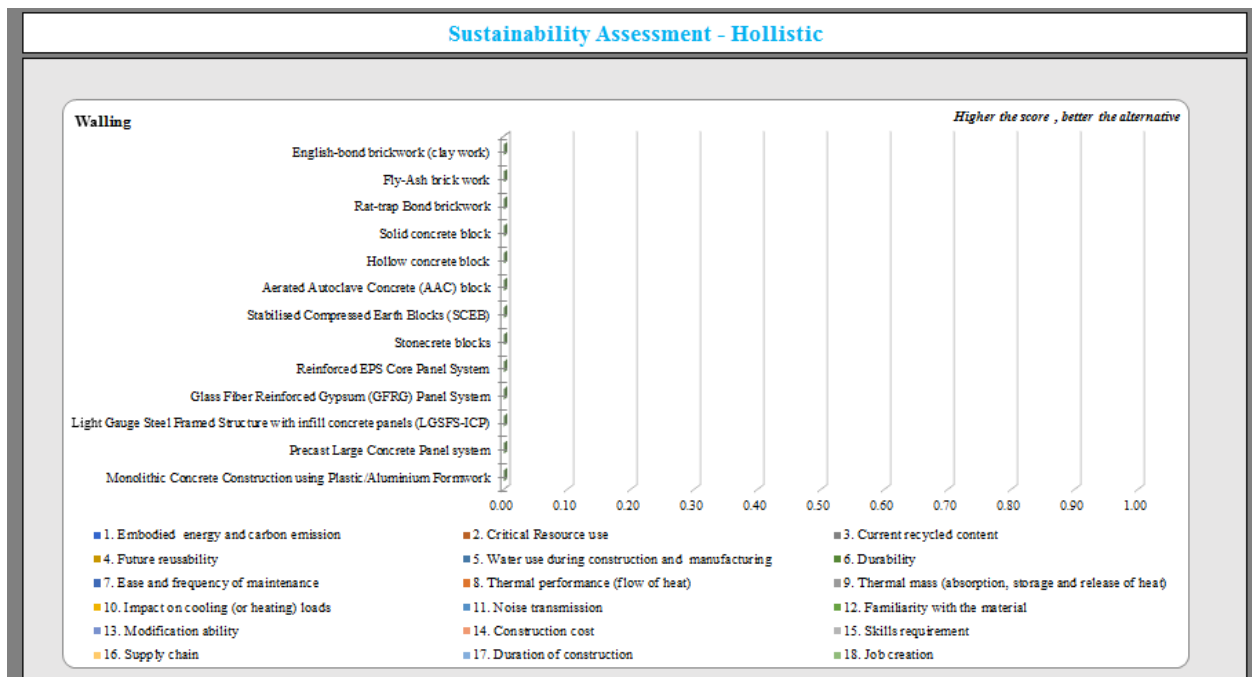

Figure 3: SAT graph displaying 'Sustainability Assessment – Holistic'

Using the SAT

Getting Started

Step – 1 – Select a project location from the dropdown list, which would automatically determine its climatic zone (the climatic zones and cities have been defined as per ECBC 2017).

Figure 4: Step – 1 Selection of location from the dropdown list to determine the climatic zone

Step – 2 – Select the attribute or attributes grouped under Resource Efficiency, Operational Performance, User Experience and Economic Impacts to evaluate a total of 17 walling and roofing technologies. The selection can be done by picking a '*Yes*' from the dropdown list placed under each attribute.

	Resource Efficiency			
Attributes	**1. Embodied energy and carbon emission**	**2. Critical Resource use**	**3. Current recycled content**	**4. Future reusabi**
Evaluation scale	MJ/Sq. M	High-Medium-Low	%	High-Medium-L
Evaluate - Yes/No	No	No	No	No
	Yes			
	No			

Figure 5: Step – 2 Selection of attributes to evaluate the building materials and technologies

The relative performance of the building materials and technologies across the selected attributes in each main criteria could be seen in the form of graphs below the attributes.
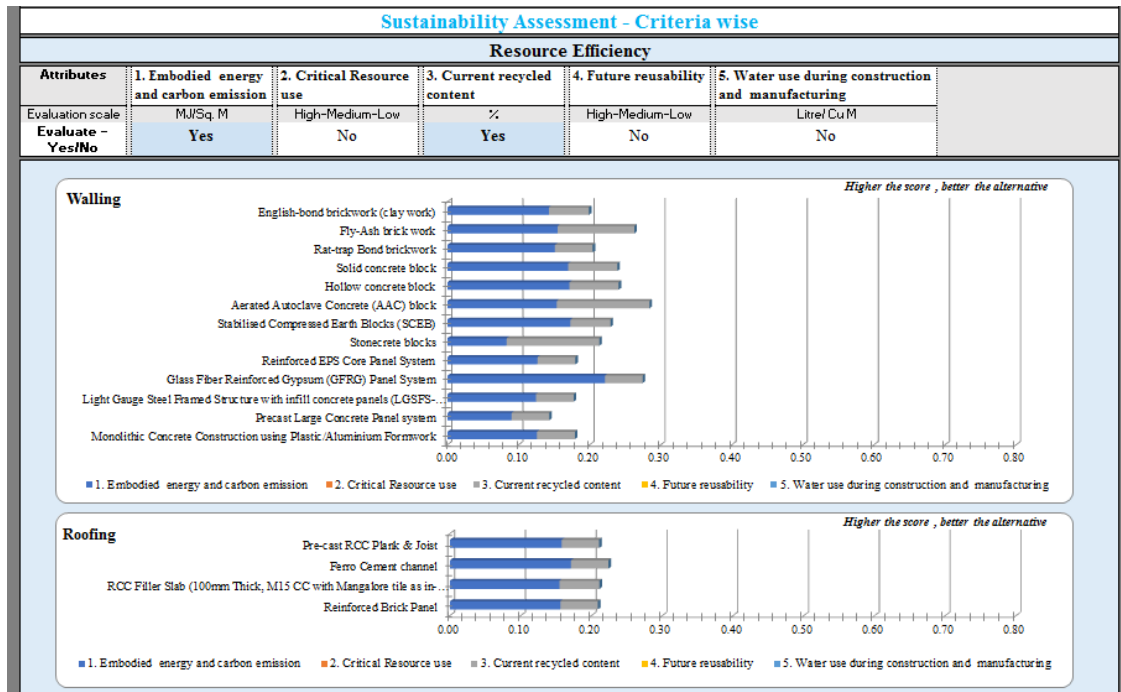

Figure 6: SAT graphs displaying scored building materials and technologies

Results

Higher score of a building material or technology with respect to others is an indicator of its better performance. Precisely, higher the score, better the building material or technology.
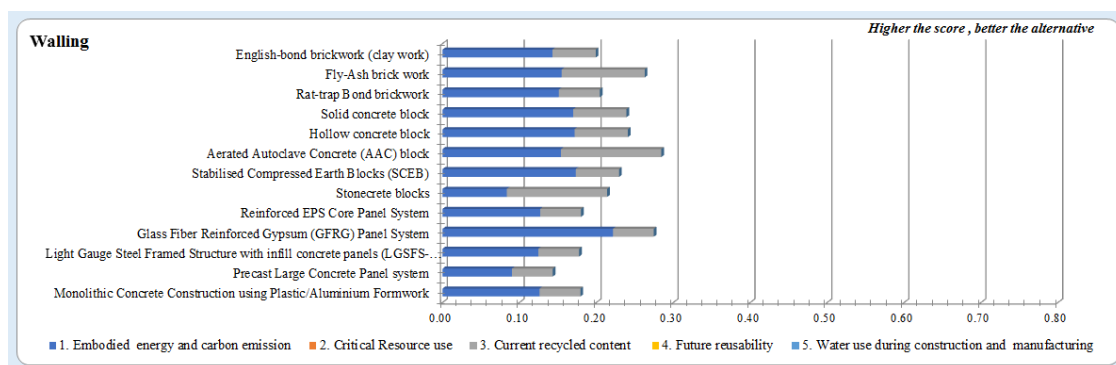

Figure 6: SAT scores of the walling materials across 2 selected attributes

Higher score of AAC block in the above example with respect to all other building materials and technologies is an indicator of its better performance across the selected attributes in the resource efficiency criterion.
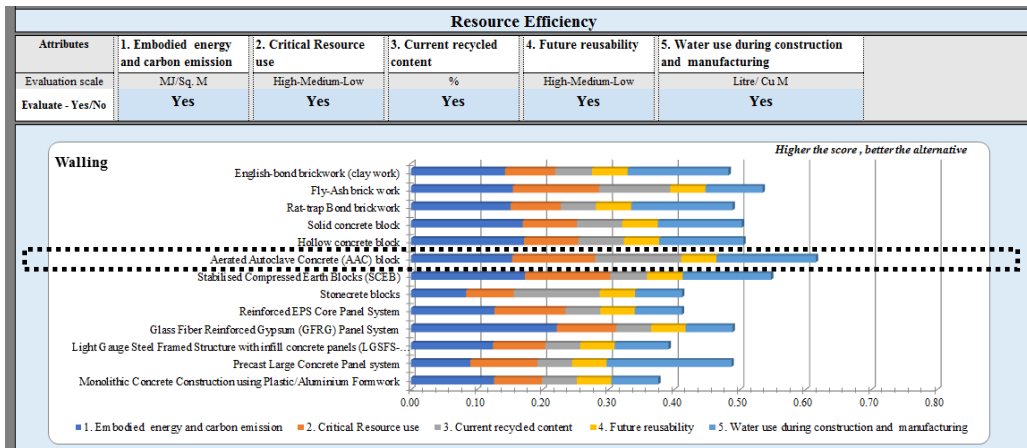
Figure 7: SAT scores of the walling materials across all attributes under Resource Efficiency

Higher score of AAC block in the above example with respect to all other building materials and technologies is an indicator of its better performance across all the attributes in Resource Efficiency. Similarly, the user can assess the relative performace of the building materials and technologies in the other three main criteria.

A holistic score of relative performance of all the building materials and technologies across the selected attributes under all main criteria is displayed at the end of the SAT.
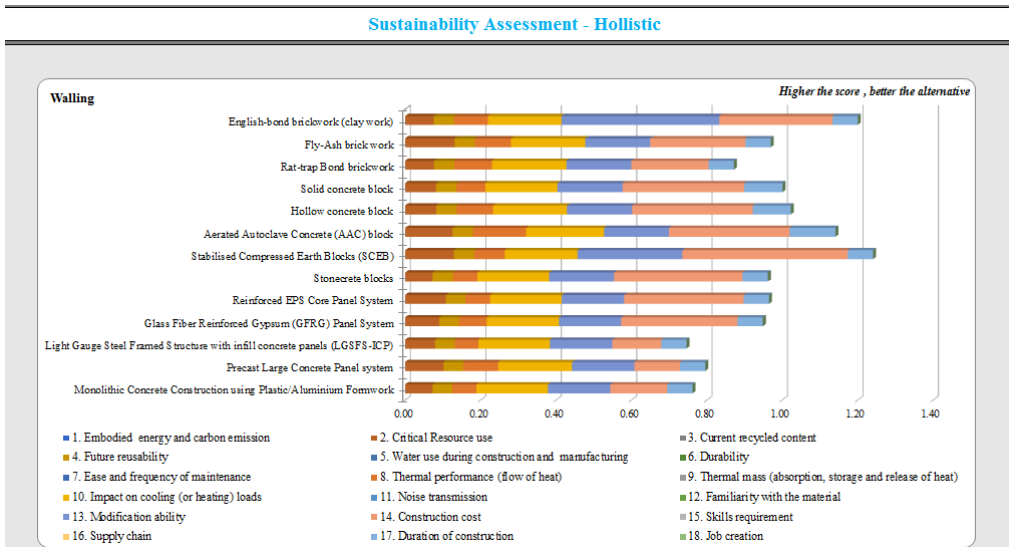

Figure 8: Holistic SAT scores of the walling materials across selected attributes under all main criteria

MaS-SHIP

Mainstreaming Sustainable Social Housing Project in India (MaS-SHIP) is a two-year research developed to promote sustainability in terms of environment performance, affordability and social inclusion as an integral part of social housing. Funded by United Nations Environment Programme (UNEP) 10 Year Framework of Programme on Sustainable Consumption and Production (10YFP).

Contacts

OXFORD BROOKES UNIVERSITY
Prof. Rajat Gupta (Project lead) rgupta@brookes.ac.uk

teri
Sanjay Seth
sanjay.seth@teri.res.in

Development Alternatives
Zeenat Niazi
zniazi@devalt.org

UN@HABITAT FOR A BETTER URBAN FUTURE
Jesus Salcedo
jesus.salcedo@un.org