Sustainable Building Initiatives with MyCREST

MyCREST: Rating Project Sustainability with MyCREST
BEST PRACTICES: Superior Assessments Through Science
PERSONALITY: An Insider’s Look at MyCREST Sustainable Construction

VOICE OF
SUSTAINABLE CONSTRUCTION EXCELLENCE CENTRE (MAMPAN)
CONSTRUCTION RESEARCH INSTITUTE OF MALAYSIA (CREAM)
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Many factors are coming together to bring sustainability issues to the forefront. As more and more people compete for limited resources, other factors relating to the environment show the need for forward thinking regarding related construction methods. While businesses in the past may have ignored some of these issues in favour of their own bottom lines, they are now recognising that a focus on sustainability benefits them, too.

In order to implement and promote a model which will help businesses meet these kinds of goals, the Construction Industry Development Board (CIDB) developed the Sustainable Construction Excellence Centre (MAMPAN) under the Construction Research Institute of Malaysia (CREAM). MAMPAN’s initiatives will increase compliance and participation towards sustainability in the short term, making Malaysia a regional leader. In the long term, MAMPAN’s efforts will reach beyond the region to provide an example of sustainable construction for the world.

In the past, construction methods were not focused on sustainability, and buildings and infrastructure were particularly vulnerable to natural disasters like floods. Climate change is exacerbating problems related to weather, and sustainable construction practices will help protect against those. MAMPAN will also promote the adoption of the Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST), which is a sustainability tool that quantifies carbon levels at every stage during the building process. This tool was introduced by the Works Ministry through the Public Works Department and CIDB, and it gives guidance to sustainability practices in constructing and maintaining buildings.

Among the benefits of these sustainability measures will be lower costs resulting from natural disasters, reduced costs in development projects, and reduced carbon emissions. Most importantly, these efforts will make Malaysia’s building industry a leader in first the regional and then the international construction market. A few dozen projects have been assessed so far, with more being developed. The MyCREST rating system awards certifications for each stage of a development.

Welcome once again to Bina MAMPAN, the official quarterly publication of the Sustainable Construction Excellence Centre (MAMPAN) and the voice of sustainable construction for the Malaysian construction industry. Inside this issue, you will find articles relating to sustainability in the construction business, and the attempts to help businesses meet new sustainability goals.
Rating Project Sustainability with MyCREST

Construction leaves one of the largest footprints in terms of environmental impact because of its use of resources, energy and waste. Becoming a responsible world player means finding ways to reduce that environmental impact while still becoming competitive in the regional building industry.

Why Create a Ratings Tool Like MyCREST?

In order to deal with increasingly pressing environmental concerns while staying competitive commercially, Malaysia has introduced MyCREST as a ratings tool. MyCREST can be used to certify the sustainability of construction projects, using a series of criteria at each stage of the building process. Meeting the criteria in MyCREST, these environmental impacts will be minimised not just in Malaysia but regionally. With hard work and continued efforts from all of those involved in the construction industry, it is hoped that the influence can spread beyond this region.
How MyCREST Standards Help Improve Sustainable Building Construction Efforts

MyCREST is a tool which can be used by everyone involved in the construction industry, including architects, electricians, labourers and everyone else involved. The goal of MyCREST is to quantify various aspects of the built environment’s environmental impact in order to reduce both carbon emissions and other kinds of environmental impact. MyCREST looks at the lifecycle of the building process in a wholistic way and integrates socio-economic considerations as they relate to the industry and the urban background.

Both carbon emission and sustainable performance factors are combined with other criteria measured by MyCREST as part of its evaluation. In order to qualify for certification, all of these criteria will be evaluated at each step of the building process. In the end, there will be an overall star rating given to the project which will take into account all of the preceding factors. Successful use of MyCREST will mean decreased up-front capital costs with all team members assuming at least some responsibility for their part of the project.

Building Construction

Buildings which are already green or which want to undergo minor renovation can go ahead and start the certification process for MyCREST. The building process is divided into the Pre-Design stage, the Design stage, the Construction stage and the Operation & Maintenance stage. All new buildings must be assessed on criteria at each of these stages, with an additional category for Waste Disposal. With a holistic view, many factors go into consideration to make up the star rating.

One example of sustainable building is the Industrialised Building System (IBS), where preformed parts are made in factories and then transported to the building site. The parts are cost-effective and environmentally friendly, and it is easier to put them together than to build the building the conventional way. Construction time is fast, so less labour is required, but IBS is not as popular as it should be right now, while labour is cheap. In the future, when wages are higher, there will be increasing demand for IBS.

Carbon Emission

The scorecard detailing carbon emissions takes into account the different areas of the building at the different stages of a new construction. In the first stage, the carbon emissions are created by the creation of new materials and transportation to the site. During the operational stage, carbon emissions are measured because of energy, water, waste and other criteria as they apply to the project. Some of these values can be offset when the project uses renewable energy or offset or sequestered the carbon somehow. Assessments are made based on the MyCREST definition of embodied carbon, which can be from:

- Cradle to Grave
- Cradle to Cradle
- Cradle to Site, or
- Cradle to Gate.

The building itself also emits carbon based on needs like heating, cooling and lighting. The scorecard is divided into 3 sections based on the building stage and then sorted by whether there is carbon reduction, carbon impact or if the action is sustainable, meaning it isn’t related to carbon use but does impact a different environmental area.

Success of MyCREST

Because of its holistic approach, there are reasonable goals within the process that those involved in the construction industry will be able to meet. While there are long-term goals, the MyCREST tools allow individual construction projects to be measured for their own success too. Short-term goals and long-term goals can be balanced as all participants in the construction industry work toward the same end.
The Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST) serves as a guide to reduce carbon emissions and the environmental impact of building construction in a holistic manner. In this showcase, we highlight three buildings that have received MyCREST ratings for admirable sustainable construction innovations.
Menara KKR2

- **MyCREST DESIGN RATING:** 5-Star
- **Floor Area:** 52,272 sq. m
- **Architects:** GDP Architects
- **Location:** Kuala Lumpur, Malaysia
- **Project Year:** 2015

This 37-storey government-owned high-rise occupies Menara Kerja Raya and incorporates many features to reduce energy consumption, improve occupant comfort, reduce impact of material usage and make use of less treatable potable water.

Although the tower design incorporates floor-to-ceiling glazed facades exposed to the east and west, it reduces solar heat gain by employing triple-pane insulated low-E glazing. Coupled with efficient lighting design with a low 8 W/m² lighting power density and automated control which effectively turns off 40% of the office lights during the day, as well as air conditioning systems that can reduce fan power by more than 50% on reduced-load days, the building achieves a very respectable Building Energy Intensity (BEI) of about 90 kWh/m²/year; 60% lower than buildings designed to meet MS 1525 guidelines. Custom perforated venetian blinds, low height workstations and glass partitions for private offices and discussion rooms all work together to create an open office space that is well-lit by day and much more conducive to occupants.

A 400 m³ underground rainwater harvesting tank captures rainwater to be used in the building. These strategies and the use of low-flow fixtures at toilets and ablation stations, as well as significantly lower cooling loads resulting in lower cooling tower water usage, has managed to reduce water consumption per square metre floor area by 70% compared to a neighbouring office tower.
Wisma REHDA

- MyCREST OPERATION & MAINTENANCE RATING: 4-Star
- Land size: 2,988 sq. m
- Architects: Clement Wong Architecture
- Location: Petaling Jaya, Selangor, Malaysia
- Project Year: 2012

The successful completion of the cutting edge, well-built and green Wisma REHDA is another defining moment in REHDA's history. Its Ventilation Block Wall, which acts as a second skin and cooling system to the building, is used to protect the building interior from the scorching tropical heat while allowing natural lighting into the building, reducing electricity consumption. The Rain Water Harvesting System is in place to collect rainwater from the roof for watering and cleaning purposes. The Photovoltaic (PV) Technology, designed for a capacity of 60 kW, equivalent to 20% of the building’s power supply, produces neither air pollution nor hazardous waste to convert sunlight into electricity. Landscaping also plays an integral part in the building, with greenery surrounding the building, as well as a “mini rooftop garden” located on the first floor.

Waterside Residence

- MyCREST DESIGN RATING: 1-Star
- Location: Penang, Malaysia
- Project Year: 2016

The main green initiative in Waterside Residence was fine-tuning the passive design (involving natural lighting and cross-ventilation for the building) to reduce reliance on high technology products. Externally, the installation of green roofs cut the heat-island effect, while building facades were designed to cool the interior of units and reduce air-conditioning consumption. These also include rainwater harvesting to reduce water consumption for landscaping purposes; solar panels and wind turbines to harness renewable energy. Internally, inverter air conditioners account for up to 60% savings in electricity; energy-saving lights account for up to 22% savings; and rainwater harvesting reuses up to 3 million litres of water per month for landscaping.
The need for sustainable construction is particularly urgent in countries like Malaysia which are trying to become leaders on the world market. Because of issues relating to scarcity of resources and natural disasters relating to weather change, all countries will need to take a good hard look at the way they do business in order to make the best decisions to be more efficient and environmentally friendly.

MyCREST was created in response to those needs, and uses a broad range of measurable requirements to assess projects and buildings in Malaysia. The criteria can be applied to existing buildings and other kinds of projects, but it can be strenuously applied to new projects and building construction in order to cut down on the large carbon footprint specifically created by the construction industry. The principles will be applied liberally to cover everything related to the design, construction, commissioning, and operations of buildings.
Quantifiable Objectives

There are several objectives to using the MyCREST tools to assess projects. When using the MyCREST tools, the environmental impact of the project can be measured at every stage. Participants can also be sure that they are meeting both local and international goals for best environmental practice. This is crucial at this stage when there have been so many problems with standardisation and compliance around the world. Malaysia wants to be a leader, so meeting these goals is important.

By strictly assessing the projects at each stage of the lifecycle, it will be possible to collect the data in a database so that it can be stored, analysed and compared to newer data to prove that the strict standards are still being met. Collecting the data will also raise awareness of the lifecycle impacts for everyone involved in the building industry. As the project is conducted in a holistic fashion, different workers depend on others to earn a higher score.

MyCREST is an easy tool to understand, and hopefully it can hold up so that it can measure many different kinds of projects over a long period of time. Everyone involved in the building process can use the tools and understand the results, whether they are stakeholders, consultants, contractors or even labourers. Everyone can feel part of the team, with long-term and short-term needs being balanced out. Finally, and importantly, the use of MyCREST makes it possible to balance environmental issues with socioeconomic ones.

Measurable Criteria

MyCREST uses a holistic approach to assess not just the physical factors of building but how they fit into the broader socio-economic background. Both the built environment and the concerns of urban development are considered during the process. MyCREST uses its tools to provide quantifiable carbon assessment, measuring the carbon impact with rigorous scientific tools. These assessments go far beyond normal standards, which only normally choose one point during the life cycle of the building process to measure the environmental impact.

Here is an example of how points are assessed using MyCREST: 1 point can be received for implementing carbon sequestration strategies, with the justification that it helps to capture carbon dioxide into the atmosphere. This was done by implementing bio-swales, rain gardens or other related strategies that would achieve the desired aim.

Helpful Tools

There are three basic tools in the MyCREST toolbox, and they are used to create a scoring plan to assess a new or existing building for certification. The tools include the Design tool, the Construction tool and the Operation and Management tool. These tools are used at their respective stages during construction, and include a scorecard, a reference guide, and a carbon calculator which measures the carbon emissions during that specific stage of construction.

By using these tools, the project can earn a star rating based on the specific criteria that are outlined for that stage of development. Each stage of development will need to earn its own certification, so by the time the project is complete there may be a Provisional Design Certification, a Design & Construction Certification, a Design, Construction and Operation & Maintenance Certification and/or an Operation & Maintenance Certification.

Comprehensive Assessment

There are several criteria which are assessed by MyCREST, with most of these criteria being assessed at every stage of the building construction. The Design stage is the only stage which assesses Pre-Design, and Operation & Maintenance is the only stage which assesses aspects of Waste Management & Reduction and
Sustainable Facility Management. There are several criteria which overlap with more than one stage:

- Infrastructure & Sequestration
- Energy Performance Impact
- Occupant & Health
- Lowering Embodied Carbon
- Water Efficiency Factors
- Social & Cultural Sustainability
- Demolition & Disposal Factor
- Sustainable & Carbon Initiative

**MyCREST Scoring and Application**

Each of the three stages of building development receive its own star rating, with a final score being given to the overall project. Those who only receive 40-49 points receive one star, 50-59 points receive two stars, 60-69 points are awarded three stars, 70-79 points receive four stars, and 80-100 points receive a 5-star rating.

In order to receive a certification, an application must be submitted to the Secretariat. Once the Secretariat has a complete application, he will check the application and assess a fee, which is based on whether or not it is a renewal and the gross square footage of the project. Once the applicant pays, the Secretariat will then issue the Certification. The process is exacting and must be done every time that the builder wants to move on with a project.

**Effects of Using Strict Criteria**

There are several reasons that the use of MyCREST leads to improvement and innovation in the construction of sustainable buildings. The first most obvious reason is that the use of MyCREST makes all the individuals involved of the impact their actions are having, which makes them more conscious of what they are doing and more likely to make attempts to work toward sustainability goals. People are also more likely to cooperate in a programme when they feel that they are a part and their voices are important.

Once other countries can see what is being accomplished and how, it will improve the reputation of Malaysia and its building industry. This will lead to greater cooperation among nations, and a leadership position in the region by Malaysian industry leaders. As Malaysia sets the example for sustainable development, there will be more opportunities for growth and wealth acquisition. This will benefit those directly involved in the industry, but it will also positively affect other Malaysian citizens. Finally, the real impact of such strenuous environmental measures will be felt as the effects of the policies are shown.
High Standards in the BIG PICTURE

In order to meet the nation’s goals regarding carbon reduction and sustainability, various governmental entities in Malaysia collaborated on a tool which would make it possible for workers to make and meet specific goals. Because it is being done in a spirit of collaboration, there are high hopes that MyCREST will help Malaysia become first a regional and then a world leader. Understanding the MyCREST goals and specifications is the first step to implementing and expanding the practices of sustainable building within the context of the construction industry as a whole.
Why Is MyCREST?

MyCREST stands for the Malaysian Carbon Reduction and Environmental Sustainability Tool. It is an important part of the strategic framework Malaysia is using to make its construction industry not only competitive in the world market, but responsible as far as how industry practices affect the environment. It was originally created when the Public Works Department (JKR), the Malaysian Investment Development Authority (MIDA), the Malaysian Green Technology Corporation (GreenTECH Malaysia) and the Real Estate and Housing Developer’s Association Malaysia (REHDA) got together in the spirit of cooperation to find out how they could work together toward the same goals.

Together, the Works Ministry, Public Works Department and Construction Industry Development Board (CIDB) have launched MyCREST, which is an assessment tool which will be used to help and guide the players in the construction industry at all stages of construction. MyCREST is a green tool which is also focused on reducing the impact of carbon emissions and the environmental impact caused by various practices in the construction industry.

MyCREST was launched with a series of presentations to introduce industry players to its uses and importance. Top construction industry practitioners were given information on the uses of MyCREST as a carbon reduction and sustainability tool and how they could benefit from using it, including incentives they could receive by closely adhering to its standards. Unlike many other government initiatives, MyCREST is meant to form a partnership with all of those involved in the construction industry to encourage compliance and innovation.

How Does MyCREST Help as a Rating System?

There are officials who work as MyCREST Assessors, who rate various categories at various stages of the building process according to MyCREST standards. There are three stages of the building process which are covered, and each has various tools which are used to assess the number of stars in various categories:

1. The Design Stage:
   This includes the Design tool, the Design stage scorecard, the Reference guide for design stage, and the Design stage carbon calculator

2. The Construction Stage:
   These tools include the Construction tool, the Construction stage scorecard, the Reference guide for construction stage, and the Construction stage carbon calculator

3. The Operation and Maintenance Stage:
   The tools for this stage include the O&M tool, the O&M stage scorecard, the Reference guide for O&M stage, and the O&M stage carbon calculator

Each stage of the project will get its own star rating, and then the project will get its overall star rating. They will receive a Provisional Design Certificate in the beginning of the project, after which they can receive a

- Design and Construction Certification,
- Design, Construction and O&M certification, or
- O&M certification.

How a New Construction Application Is Processed

The first step in the process is when the applicant who wishes to start a new construction project submits a registration form to the MyCREST Secretariat. If the application is incomplete or if the Secretariat needs clarification, then there will be a chance to submit additional information. Once the application is received, the MyCREST Secretariat reviews the information, and if it is deemed complete, the Secretariat requests a registration fee from the applicant.

Once the applicant has paid the registration fee, the MyCREST Secretariat will certify the registration. The product or project will then be approved and officially registered.
In order to certify a product or project through MyCREST, the applicant will first be required to submit a completed form which shows the details of the project and how the project fared on its assessment ratings. If there is not enough information, or if there is a need for clarification or correction, the applicant will be allowed time to submit more information. Once the application is finally considered to be complete, and the Secretariat feels that there is no need for more information, the Secretariat will issue an assessment report.

At that point, the applicant will be given a chance to say whether he agrees with the results of the assessment. If the applicant agrees with the assessment and rating, a certification will be issued. Because this process involves the application being submitted to an official independent third-party partner, there is an attempt at keeping the assessments fair and unbiased.

How Does This Improve Sustainability?

There are many ways in which MyCREST is able to improve sustainability, and those results will be shown more and more with time. The MyCREST assessment tools measure projects based on criteria which supports sustainability, so anyone who starts working on a project will have goals which they can look at and aspire to from the beginning. The MyCREST tools also involve trained professionals from the beginning of the process all the way to the end, giving them access to information and making them partners in working toward the goals of the programme.

MyCREST uses comprehensive ratings to assess important aspects of projects that were overlooked in the past, because of issues of efficiency or even money. The criteria for a successful high score using the MyCREST tools include everything from infrastructure to energy to design. The principles relating to the sustainability goals are embedded in every stage of every project.

With the standard use of MyCREST and continual progress in meeting stated goals, the Malaysian government will have a better reputation with its own people and with the rest of the world. As everyone involved in building projects learn to work with government initiatives, they will become used to working together and learn to collaborate on a regular basis. This kind of cooperation will lead to greater innovation and cooperation than before.

How MyCREST Raises the Standards for Sustainable Building Construction in Malaysia and Beyond

Malaysia has set its goals in a way which is reasonable but stringent, so that there will be continuous improvement as far as meeting its goals with room for improvement. When specific goals are met, there is already a plan for moving on and moving beyond that goal. The first goal is to require every large government project to be certified by MyCREST by 2020, but this is just the first step in the plan.

Government leaders are already involving local leaders and letting them know how they can take advantage of tools like MyCREST to work toward sustainability themselves. By offering their support, the government leaders are taking the next step to make industry standards uniform throughout Malaysia. As Malaysia meets its goals of reducing carbons and taking other steps toward ensuring the best environmental practices, it will build on its success by partnering with other nations and using this level of cooperation to become an industry leader in the region and beyond.
Malaysia has been making major progress toward its goals of sustainability and green production for decades now. By looking at the goals which have been set, it is possible to see how far Malaysia has come, and the promise of great things in the future. Understanding what brought us to where we are today is crucial for implementing strategies and practices that will bring us into tomorrow.

History and Progress of Sustainability in Malaysia

Malaysia has been making progress toward a comprehensive sustainable development programme for decades. The New Economic Policy (NEP) was introduced in 1970 in order to bring more balance to the societal inequalities that could be found all throughout Malaysia, in an attempt to eliminate poverty and bring about more fairness in society. The elements of sustainable development have been practiced from an early period as the country worked to improve economic growth while bringing about more equitable access to resources for Malaysia’s citizens, including education, healthcare and utilities.

This programme of major improvements was followed by and improved upon when Malaysia formed the New Economic Model (NEM) in 2009. With a continuing emphasis on sustainable development, the foundations of the NEM included high income, inclusivity and sustainability. The NEM provides the basis for Malaysia’s 5-year economic plans until 2020, with the current plan being Malaysia’s 11th and covering the years 2016–2020.

Bringing Sustainability Principles into the Construction Industry

In Malaysia, the Construction Industry Development Board (CIDB) is the government agency in charge of raising the standards in the construction industry. The CIDB is
the statutory body which sets policies for the construction industry, and has the power to require participants to take courses and pay fees on all construction projects. By law, no one may take part in a construction project without a certificate provided by CIDB.

CIDB has developed MAMPAN, which is the Sustainable Construction Excellence Centre. MAMPAN’s operating model provides a framework for the Malaysian construction industry to bring about sustainable development practices. This is done through development, promotion of the projects and ideas, and implementing initiatives which will improve practice.

MyCREST Gives an Edge

MyCREST is the Malaysia Carbon Reduction and Environmental Sustainability Tool which will help the construction industry to become more sustainable and environmentally-friendly. As a sustainability assessment tool, MyCREST is used by the Works Ministry to rate and quantify the overall sustainability and carbon emissions of construction projects at every stage of the building lifecycle, both before and after its beginning and completion.

Some of the socio-economic factors considered in MyCREST’s use include a lower cost of damages from natural disasters, a reward of increased benefits that comes with decreased carbon emissions, and a higher level of competitiveness and growth within the construction industry.

Tools for Sustainability

MyCREST awards a specific star rating and provisional certification for each stage of a construction project, to provide feedback for those in charge, so that they can make immediate adaptations to meet the goals for sustainable development.

The 3 basic tools of MyCREST provide a scoring plan for three stages of development: Design, Construction, and Operation and Maintenance. Criteria considered include:

- Energy performance impact,
- Social and cultural sustainability, and
- Sustainability facility management.

So far, there have been 24 development projects, with 6 of those projects being certified by MyCREST.

By partnering with industry leaders, the use of MyCREST is not only able to support and promote its own principles regarding sustainable development. MAMPAN plans to adapt these ideas in a broader range. When working closely together toward the same goals, new innovations can quickly be shared throughout the construction industry. Also, there will be a platform on which innovators can bring their ideas or bring about new research projects. This collaboration does not stop at national borders. Malaysian industry leaders will have the ability to collaborate with the industry leaders from surrounding countries to share ideas. They will also be able to take advantage of foreign business opportunities, where they can share their principles relating to sustainable development.

Collaboration for the Future

Instead of being a static programme with no thought or real interaction, MyCREST depends on interactions with industry experts both during the specific building projects and as part of the ongoing process. By staying in touch with the top experts, information is available about what projects are
being done and what kinds of challenges they are facing. While MyCREST evaluates specific subjective and objective criteria, those most invested and involved in the construction industry give their feedback about the effects that occur as a result of these practices and standards. Without this constant feedback, Malaysia would not be able to make the changes necessary to work towards its goals. There needs to be continual feedback on both sides in order to ensure that all of the participants in the construction industry can make progress toward meeting the goals set for sustainable development.

Putting Ideas into Practice

A meeting was organised by the Ministry of Urban Wellbeing, Housing and Local Government (KPKT) and CIDB Malaysia on 28 September 2017 to put some of these ideas into practice in the lower levels of business. About 100 local council officers attended the meeting, which was organised to help them understand their roles in helping Malaysia to achieve its goals for sustainable development by the year 2020.

The Deputy Director-General of Local Government Department Mohammad Ridzwan Abidin initiated the proceedings by letting the local leaders know that they were instrumental to the plan because they were the ones who could interact with local businesses and citizens on a personal level. There were other speakers and briefings, including information on how they could take advantage of important tools like MyCREST to provide better and more sustainable products.

The presenters let the local leaders know that, while many local businesses did not have enough money to pay for expensive tools, these tools were being provided for free or at very low cost to help them carry out the kinds of initiatives that would support Malaysia’s plans for sustainable development. More of these talks will be planned for future dates.

The Road Ahead

The goal is to make sustainable construction mandatory by 2020, for all government projects worth at least RM100 million. This will be done using the principles from the economic plan and by using tools like MyCREST. In the meantime, the construction industry is dealing with ongoing issues like damage to construction projects by natural disasters like floods and construction waste improperly deposited in landfills.

Because of Malaysia’s success in using the principles of sustainable development throughout its processes, it hopes to gradually apply these principles to more and more projects until they are the standard of practice throughout Malaysia. Since the practices are starting from the top, and part of an economic plan, they can be applied throughout the national industry, starting with high end government projects and working down to small projects. By consistently practicing the principles of sustainable development in the entire construction industry, Malaysia can become a regional leader in the near future, and a world leader later after that.
An Insider’s Look at MyCREST Sustainable Construction

The latest addition to Malaysia’s portfolio of sustainable building rating systems, Malaysia Carbon Reduction and Environmental Sustainability Tool (MyCREST) has great ambitions. Not only does it aim to assist our builders in reducing the built environment’s carbon emissions, it also has the grand mission of guiding our nation’s builders towards a more holistic lifecycle perspective of buildings and their impact on the planet and the way we live, work, and play. To discover its origin story, Bina MAMPAN spoke to Ar Abdul Zaki Abdul Wahid to discover the genesis of the Malaysian construction industry’s premier environmental sustainability rating tool.
The Origin Story

To truly understand the history of MyCREST, according to Ar Abdul Zaki Abdul Wahid, a member of the initial working group, one would have to travel back in time to the 1990s.

Recalling the state of the industry back then, he said, “We looked at buildings as products. The problem with viewing buildings as products is that for so many years, we had been building them very fast and very cheaply. And we kind of forgot about the environment.” He opined, “How do you educate the community, specialists, architects and engineers that buildings should be efficient and good for the environment? By producing a tool that can tell everyone that these are the criteria for a good building.”

Hoping to shift the mindset of the industry towards the built environment’s impact, Zaki and several other architects including Serina Hijjas started sending feelers in governmental agencies to create green building rating tools.

Recalling the development of GreenPASS, Zaki added, “There were two approaches. Green Building Index (GBI) was looking into a design perspective, but I was a bit opposed to that. When the economy slows down, people will build less but we still have a problem with our existing stock of buildings. How do we deal with the existing buildings in Malaysia, which no one even cares about how well they are performing? Buildings perform differently every year. I call it a performance-based approach. That was the start of GreenPASS.”

Each tool was designed to be applied at some stages of a building’s lifecycle (i.e. design, construction, operation and maintenance) with none of them covering the entire life of a building. Since some of these stages overlapped, developers often had to seek certification from multiple systems.

While there were some overlaps in the areas assessed, gaps existed too. Some systems did not assess waste and carbon emissions while others did not assess site management and planning. For example, GreenPASS measured carbon emissions during the construction and operation and maintenance stages but did not cover emissions generated during the design stage. On the other hand, while design-focused pHJKR assessed energy and water efficiency and sustainable planning measures, it did not measure carbon emissions. It was confusing, to say the least.

Around 2010, the idea to merge pHJKR and GreenPASS into a single rating system was born, but Zaki was initially opposed to it.

“My idea was to have pHJKR and GreenPASS separate instead of combining them. pHJKR was a design-based approach while GreenPASS was a performance-based approach,” he recalls.

“Someone asked me to look into it. I said back then, that if you combine them, it will be very complex, and it would defeat the purpose of educating the community and establishing a performance-based understanding of buildings.”

As a building’s environmental impact is not the only measurement of sustainability, there was also a need to integrate indicators that measured the impact buildings had on the communities’ health, safety, and productivity. Thus, MyCREST was born.

The Criteria

Designed to span the design, construction, and operation and maintenance stages, MyCREST assesses eleven criteria or categories including pre-design, infrastructure and sequestration, lowering embodied carbon and waste management. Under each criterion, there are several sub-criteria which stakeholders can choose to apply to their projects to score points.

1. Predesign

An integrated design approach is essential to the success of any construction project, let alone a green building project. One sub-criterion requires stakeholders from multiple disciplines to hold at least one full-day eco-charette, so they can brainstorm ideas and establish sustainability goals. Another sub-criterion requires at least three of the project’s team members to utilise Building Information Modelling (BIM) software as many of the tools in BIM including energy-use modelling provide detailed information on the ways design changes impact building performance. Involving a facility manager to the design team, another pre-design sub-criterion, ensures that the design will cater to the needs of end users.

2. Infrastructure & Sequestration

Under this criterion, project members are required to establish and implement strategies to minimise environmental pollution and lock carbon. As trees are unique in their ability to lock carbon up, the preservation and restoration of greenery is highly instrumental in sequestering carbon. Wherever possible, the project team must ensure that large trees have been protected. In a bid to increase urban density and promote walkability, another sub-category requires MyCREST projects to provide pedestrian walkways. A third sub-criterion encourages projects to locate their buildings within 800 metres of a railway station, 400 metres of a bus station or provide a shuttle between the buildings and public transport stations.
3. Energy Performance Impact
This criterion covers approaches aimed at reducing the amount of energy that buildings consume through heat control and ventilation measures, lighting systems, and passive design. By controlling the selection of glazing, window size, wall type and other factors, the amount of heat conducted through the building envelope will be reduced. In turn, the building’s occupants will be less reliant on air-conditioners. Other sub-criteria involve designing spaces to increase the admission of usable sunlight and decrease the unnecessary usage of interior lighting.

4. Occupants & Health
Designed to safeguard and improve users’ health and wellbeing, this area spans measures to control indoor air quality and prevent mould. For example, projects have to design ventilation systems to meet or exceed the minimum outdoor air ventilation rates as described in the ASHRAE Standard 62.1-2007. Smoking restrictions also must be enforced in line with the Control of Tobacco Product (Amendment) Regulations 2004 and 2008. MyCREST projects also have to use zero or low volatile organic compound (VOC) content sealants, paints, and other building materials.

5. Lowering Embodied Carbon
This section details approaches to reduce the amount of embodied carbon or carbon emitted during the extraction, manufacturing, transport, construction, and disposal of building materials. One sub-criterion encourages project members to source timber from responsibly managed forests. Two sub-criteria encourage the use and reuse of salvaged and recycled materials or materials with recycled content, effectively reducing the amount of embodied carbon since less raw materials need to be extracted from the natural environment.

6. Water Efficiency Factors
Since energy is used to purify fresh water sources to potable levels, to transport water from the source to the building, to treat wastewater, the production, distribution and treatment of water for buildings are energy-intensive activities. Hence, this criterion is aimed at encouraging users to use water efficiently and with purpose. MyCREST projects are encouraged to design landscaping strategies and elements that encourage rainwater harvesting and reduce the use of potable water for irrigation. Recycling of wastewater for activities such as cleaning is also encouraged.

7. Social & Cultural Sustainability
Sustainable buildings aren’t just measured by the amount of energy saved or the carbon locked in trees, they also take into account the comfort, happiness, productivity and identities of the people who use them. Projects should endeavour to make their buildings socially inclusive and accessible to everyone. One sub-criterion addresses the inclusion of facilities designed to improve the ease of access for people with disabilities. Strategies include audio and tactile signage for the vision-impaired and evacuation chairs to aid people who are less mobile. Project members also have the freedom to express their cultural heritage in ways that are compatible with the building design.

8. Demolition & Disposal Factor
Aimed at diverting waste from landfills, this criterion encourages projects to source materials responsibly from suppliers and manufacturers who have buyback programmes. Team members are also encouraged to design for disassembly in one sub-criterion by specifying materials which are easily
disassembled such as interlocking brick walls and precast blocks. Reusing existing building materials and structures is also encouraged, as it decreases waste. For example, existing walls, floors and roofs in good condition can be reclaimed before demolition. Aside from decreasing waste and construction costs, it also leads to the evasion of potential carbon emissions from the transportation of waste to recycling centres and landfills.

9. Sustainability & Carbon Initiative

This category recognises the innovative efforts project members take to contribute to sustainability as well as avoid, offset, and reduce carbon emissions. The first sub-criterion necessitates the inclusion of a MyCREST Qualified Professional in the project team to ensure the implementation of MyCREST goals and processes. Secondly, any initiative under this criterion must meet one of the following requirements:

1. Carbon sequestration,
2. Carbon reduction under scope 3 of GHG emissions – emissions generated during employee commutes, business travel, embodied carbon in purchased goods and so on – and
3. Technological advancements to improve building performance.

Under this criterion, projects are also encouraged to incorporate the Clean Development Mechanism into the building design and operations to encourage technology transfer from developed countries.

10. Waste Management & Reduction

While this category seems similar to the Demolition & Disposal Factor criterion covered earlier, the Waste Management & Reduction category is aimed at managing and reducing waste generated by the building’s occupants and users during the operations and maintenance stage of a building’s life. The Demolition & Disposal Factor only spans the design and construction stages.

Firstly, project members must develop a waste management policy based on the Reduce, Reuse, Recycle, Compost, and Landfill waste management hierarchy. A second sub-criterion requires project members to educate building occupants and users through a waste minimisation awareness programme. Thirdly, project members have to reuse or recycle at least 50% of consumable waste. Consumable wastes are materials which have a low cost per unit and are regularly used and replaced in the course of business such as tin, paper, and glass.

11. Sustainable Facility Management

This criterion ensures project members implement the best practices for the operations and maintenance of their buildings. Strategies under several sub-criteria include appointing an operations and maintenance team to ensure all facilities and equipment are well-maintained and implementing a maintenance plan which will guide the team in preparing the annual asset maintenance and operation budget.

All in all, MyCREST has come a long way since the early days of its inception, and its beneficial effects can now be seen in our modern buildings. However, we are in the early days of ascendance in sustainable building as an industry, and many more committed personnel such as Ar Zaki are needed. To that end, we spoke to him about his career thus far, and what prospective architects can come to expect. He was happy to oblige and share his experiences.
The Demands on an Architect

Armed with a degree in architectural engineering and a master’s degree in engineering from Oita University, Ar Abdul Zaki Abdul Wahid spent the formative years of his career in Japan.

“Then I came back [to Malaysia] and worked as a lecturer at University Tun Hussein Onn for many years, specialising in building performance, engineering, and other things. I did some architectural projects.”

He then switched his focus to technology and looked into the ways technology could affect buildings. “Flexcility Systems Sdn Bhd is my second company. Our major focus right now is doing a lot of R&D, especially on solutions for buildings, especially in building maintenance. How do you monitor hundreds of buildings in Putrajaya using an app or system? That’s what we’re doing right now.”

The 40-year-old CEO shared, “We have a few projects doing business optimisation and other small solutions, but our core is to develop a web-based system so that buildings can tell us if they’re not healthy. Buildings can tell us when we’re not working and not performing well.”

This software would be able to monitor all kinds of buildings and facilities. “It just depends on our capacity to adapt to those complexities and those activities. We’re trying to adapt our technology to manage a lot of complexities and activities in a few seconds. Take WhatsApp, for example. There must be a billion transactions per second. There must be a good form of technology that manages those transactions.”

Aside from developing a game-changing app that will monitor hundreds of facilities and buildings, the architect who also “moonlights” as a UTHM lecturer is pursuing academic research. “On the other side, I’m doing a PhD in building law and how building laws can shape our industry.”

“The Hardest Job in the World”

Architects have the toughest jobs and the greatest responsibilities in the world. To Ar Zaki, they have the power to shape people’s lives through their design.

“You must know science. You must know the environment. You must know society. You must understand the impact of everything you do. Everything you build will influence and impact society. During my first day in class, I tell my students that ‘architects are like gods, and you mustn’t and can’t mess up people’s
lives.’ In Japan, there are a lot of earthquakes. You can kill people and suffocate people with your design if you’re not careful.”

He continued, “The quality of the buildings all depend on the architects. If the architects lie to you, if the design is terrible, you get a terrible quality of life. Architects have a critical role how their design is shaping the behaviour, environment and culture in which humans live. If you build a city for driving, it will be like all other cities in Malaysia. Car cities.”

Asked if it was possible to move towards more walkable cities, he answered, “It’s possible. It’s human engineering. A very good example is Singapore. They started around the same time as we, but they got a little more advanced in their economics and now they can walk around in Singapore. They don’t need cars anymore. Of course, it’s very compact. We need a lot of compact city centres, so we can walk around. We can still use cars, but less. We need more buses.”

In designing for environmental sustainability, what was the greatest challenge he’s faced thus far?

“Unlearning habits is the biggest challenge. Companies are used to making profits by using cheap labour, cheap technology, easy approaches, and cheap materials. Throw away those habits.”

Getting rid of old habits is a tough process though, and Zaki concurs, “We have to start with the industry. At the same time, you cannot expect young people who come into the industry to automatically have the right attitude and ethics towards the environment. Change the mindsets of the young people. The industry must change to make the unlearning process faster. Then the youth will learn how to do things better.”

As for projects that proved to be especially memorable and challenging, one project in Japan around 2002 or 2003 came to his mind.

“There was one complaint from the women on the staff about the toilets. We found out the female staff had to walk through a hallway facing the smoking area and the lobby to get there. They felt they didn’t have their privacy,” Zaki recalled. “The women went to the bathroom to chat, to touch up their makeup and so on. So, every time they went to the washroom, everyone could see them. We had to redesign another pathway to the toilet.”

Applying the lesson on a bigger scale, he said, “I learned that the approach towards a product is critically important. A building can be beautiful, but if everyone has to get there with a car, then you should be ashamed, as an architect.”

What remuneration levels can aspiring architects expect?

“Most fresh graduates start small by joining firms, because they know that with five or ten years of experience, they can practise on their own. The hurdle is the first five years working with other people. Some people become partners. Others jump to bigger companies to get around RM10,000 a month. Normal salaries for fresh grads are around RM2,000 to RM3,000 monthly,” he reveals. What skills and character traits do aspiring architects need in this profession?

“To be a registered architect, you need to have a degree recognised by the institution. My degree wasn’t recognised, because I was trained in Japan. They told me, ‘You’re an engineer.’ The approach in Japan is different. There, architecture falls under engineering practices. Here in Malaysia, architecture is based on science,” he adds. “To be an architect, you have to be a multitasker rooted in society. You must be able to analyse a lot of things. For example, if you build a door a certain way, people will find it easy to come and go. But if there’s a fire, people will be safe.”

Recalling memories of his early days in the profession, Ar Zaki comments, “Of course, right now, computers help us a lot with fire and structural simulations but long ago, you just had to imagine.”
This climate change scenario has created a quandary for builders and developers who are interested in turning their buildings green. In an effort to create sustainable buildings that use less renewable materials and energy, these stakeholders are sacrificing building resilience with “going green.” They are looking at the long-term environmental impact their green building will have to the region and the benefits that can be gained by having an energy-efficient building. However, one strong storm can completely devastate their green buildings, leading to increased costs and material waste. In the end, their construction efforts are missing the mark in being both green and resilient if they must reconstruct the damaged building from the ground up again or abandon the site completely.

### What Is Building Resilience?

Building resilience focuses on two main aspects of the structure: robustness and rapidity. These aspects basically encompass how strong and stable (robust) a building is to ward off natural disasters, and how quickly the building’s functions can recover (rapidity) when there is damage.

To determine the resilience of a building, quality and time measurements are used to analyse the functions of the building and how quickly these functions move through the recovery stages after a disaster. Each time point is examined from the moment when the disaster strikes and throughout the period when the building functionality systems recover. The faster that a building moves toward full system capacity can determine its resilience while revealing structural areas that could use improvement.

### Green Buildings Missing the Mark on Resilience

When it comes to making a building resilient and green, too many builders are deciding to focus on one sole factor: sustainability. They are looking for the immediate benefits of a sustainable structure that will help to make the building more cost-effective and environmentally friendly on a daily basis. Builders rarely take into consideration the resilience of the building materials that are used for...
certain structures in specific locations that may be prone to natural disasters such as storms, floods, wildfires or earthquakes.

Another problem with the present construction of a green building involves the lack of consideration toward future inclement weather patterns. Due to climate change, the ferocity of storms has increased for the past 100 years. Materials used for green buildings a few years to a few decades ago may not be adequate today in withstanding temporary or permanent damage from natural disasters.

**Linking Disaster Resilience to Sustainability**

Builders still have the ability to combine both resiliency and sustainability in their building construction to have a robust, green building which can recover quickly from disasters. They will have to create measurable quality benchmarks regarding the green products they use and how resilient these products will be toward the natural disasters that currently occur in the region.

Continuous efforts will have to be made to fully evaluate the lifecycle of the green building materials and how the products will handle certain disaster scenarios. Specific questions regarding the quality of the product may include the following:

- Will the product ward off certain types of damage?
- If damaged, how quickly and easily can repairs be made?
- What costs will be involved in repairing damages?
- Will the current product be able to ward off stronger, future disasters, or can be retrofitted with new technologies to address these catastrophes?

In addition to learning how resilient the green building materials will be during a disaster, a builder will also need to determine the resilience of the green building manufacturer’s supply chain in providing the necessary materials to repair or replace their products if they are struck by a similar disaster. The manufacturer’s supply chain timeline and resilience will also play a major factor in getting the green building up and functional again in a short amount of time.

**Creating Sustainable and Resilient Green Buildings**

Combining resilience with sustainability in building construction is an achievable option. Yet builders will have to decide whether it is cost-effective to make the necessary changes to existing green buildings to make them more resilient. They must also decide in what manner newer constructed buildings will achieve these two aspects while taking into account the unpredictability of future climate change and the severity of natural disasters that may impact the functionality of their building structures.
Architects, developers, designers and builders are more conscientious regarding the negative impacts that buildings can cause to the environment. Besides cutting down on the amount of natural resources used in construction materials as builders are opting for “green” structures, these construction professionals are also looking at how a building uses or wastes energy. The amount of energy usage can be staggering, and place a burden on existing energy grids. Creating an energy-efficient building that doesn’t hamper current building functions is the balance that must be struck by people working in the construction industry.

Turning to sustainable construction solutions to address these real-world problems has become paramount. Increasing interest in the photovoltaics market has come to the attention of stakeholders in the Malaysian construction industry as a choice that may be appropriate for their building structures.
Building Integrated Photovoltaics for Sustainable Structures

Building integrated photovoltaics (BIPV) involves the integration of solar energy technologies into the building envelope while replacing conventional building materials. The solar energy technologies, such as solar panels, can collect the energy from the sun and convert it into electricity that can be used to power electrical equipment throughout the structure. In addition, excess converted energy can also be sold to utility companies.

These BIPV products can provide multiple benefits, such as generating decentralised energy while also improving the building’s efficiency. Existing buildings can also gain benefits from these solar energy ecosystems with building added/attached/applied photovoltaics, or BAPV, during retrofits.

There are many different types of BIPV applications that could be put into use. Selecting the right one will be based on the building design, location, existing architecture, installation costs, location to photovoltaic suppliers and stakeholder interest. Current interest in photovoltaics involves roofing applications for buildings that are over 3 storeys, adding photovoltaics into the facade surface itself, and adding photovoltaics along the facade. Prefab components are also another viable means to adding photovoltaics to the building envelope to generate energy.

The benefits of solar energy photovoltaics as a sustainable building construction option are numerous:

- Offers redundancy for the current electrical network
- Enhances the structure’s energy efficiency
- Lowers the electrical grid’s transportation losses
- Allows for the creation of zero net energy buildings

Global Future of Building Integrated Photovoltaics

Europe, the United States and Asia are the main regions involved with BIPV, with Europe and the United States dominating the market. Prices took a short windfall in 2012 when a shakeup occurred with photovoltaic companies. As technologies and investments are now entering this renewable energy market, the European Union hopes to hit 20% in energy production through renewable sources by 2020 as they are making plans to hit 27% by 2030. Europe has now become the largest market of photovoltaics at 42% due to incentives that are offered in countries such as Germany, France and Italy.

Recent studies have shown that the current size of the photovoltaic market is at 2.3 GW (gigawatts). At the moment, building construction using photovoltaics has been sought out for new building construction versus retrofits of existing buildings. Roughly two-thirds of new buildings and one-third of renovated buildings are opting for facade BIPV product options for half of their projects.

It is expected for the market growth of BIPV to increase as costs continue to decrease and more photovoltaic innovations are created, as hundreds of BIPV options are available now.

In addition to controlling costs, stakeholders in the construction industry are also taking note of the aesthetic qualities of photovoltaics that won’t be a detriment to the architectural style and beauty of their buildings. Targeting the three main preferences for construction industry stakeholders of size, colour and shape of the photovoltaics will also be the main concerns for manufacturers in the solar energy industry.

Sustainable Construction Is the Sought-After Solution

For many construction industry professionals, creating an individual building using conventional materials is no longer the only option desired. Sustainable construction allows for architects, developers and builders to seek out approaches that allow for building designs with lower energy usage while using the energy more efficiently without negatively impacting building functions or the environment. Deciding on which photovoltaics to use in the building while having all stakeholders agree with the costs are just some of the few obstacles that need to be overcome.

As increased interest in BIPV and BAPV technologies expands into the construction market, PV companies will aggressively invest in newer and more cost-efficient technologies in solar energy. These products will allow construction projects in areas such as Malaysia to reap in the benefits of photovoltaics while providing sustainable buildings which are a benefit to both commercial businesses and residents throughout the region.
One-Day Course on WATER EFFICIENCY During Building Design and Construction

MAMPAN will be holding an intensive course on Water Efficiency on Thursday, 19 July 2018 at the MAMPAN centre, Level 11, Sunway Putra Tower, 50350 Kuala Lumpur.

Water Efficiency (WE) is one of the criteria stipulated in all three stages of MyCREST certifications, covering factors such as potable water usage, waste reduction, and alternate water sources. This course aims to explain WE in building construction to attendees while providing fundamental technical knowledge that they can apply, especially in regard to MyCREST. Experts will share knowledge on:

- Fundamental Design Features in WE,
- Understanding Calculation of Carbon Emission in WE Carbon Calculator, and
- Estimation of Green Cost and ROI in WE.

This will give attendants practical knowledge of the fundamentals of WE, such as designing with WE in mind, factoring it into the MyCREST calculator, and estimating project costs and benefits accurately.

MAMPAN invites all construction industry players to attend and broaden their knowledge of WE. Building owners, developers, consultants, engineers, quantity surveyors, contractors, and academicians are welcome to attend.

The course registration fee is RM600. CPD and CCD points will be awarded, and the event will be fully catered. To register, please call MAMPAN at +603 4040 0040, or email hazwan@cream.my or masria@cidb.gov.my. You may also visit www.cream.my for more information.
MAMPAN’s 2018 Exhibition Participation

Take a look at MAMPAN’s exhibition schedule for 2018! We’ll be participating in these exhibitions at these dates and places. Find us at the upcoming events and come join us there.

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<td>1.</td>
<td>The 19th International Architecture, Interior Design &amp; Building Exhibition (ARCHIDEX) 2018</td>
<td>Kuala Lumpur Convention Centre</td>
<td>4–7 July 2018</td>
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<td>2.</td>
<td>Landscape Asia (LAX) 2018</td>
<td>Kuala Lumpur Convention Centre</td>
<td>27–29 August 2018</td>
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<td>4.</td>
<td>44TH IFAWPCA Convention 2018</td>
<td>Kuala Lumpur Convention Centre</td>
<td>12–16 November 2018</td>
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BIM, MyCREST & QLASSIC Road Tour 2018

We are bringing BIM, MyCREST & QLASSIC knowledge across the country. Find us at the right place and time, and learn more about what these tools can do for the construction industry.

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<td>1.</td>
<td>Vistana Hotel, Kuantan, Pahang</td>
<td>5 July 2018</td>
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<td>2.</td>
<td>La Boss Hotel, Melaka</td>
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<td>3.</td>
<td>Tabung Haji Hotel, Alor Star, Kedah</td>
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<td>4.</td>
<td>Promenade Hotel, Tawau, Sabah</td>
<td>20 September 2018</td>
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<td>5.</td>
<td>Water Front Hotel, Kuching, Sarawak</td>
<td>4 November 2018</td>
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The MAMPAN Expert Forum

Our experts will be hosting a forum on four special construction topics. Find us at Sunway Putra Hotel on these dates. Join in to learn more and have your questions answered!

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<td>1.</td>
<td>Flood</td>
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<td>2.</td>
<td>Green Infrastructure</td>
<td>Sunway Putra Hotel, Kuala Lumpur</td>
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CHAMPIONING SUSTAINABLE CONSTRUCTION IN MALAYSIA

WE WELCOME all forms of contributions of project case studies, technical write-ups of eco-products, articles, research papers and photos for Bina MAMPAN

PROMOTING AWARENESS
Promoting sustainable construction through nationwide events such as:
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• Expert Forum
• Research and Innovations
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