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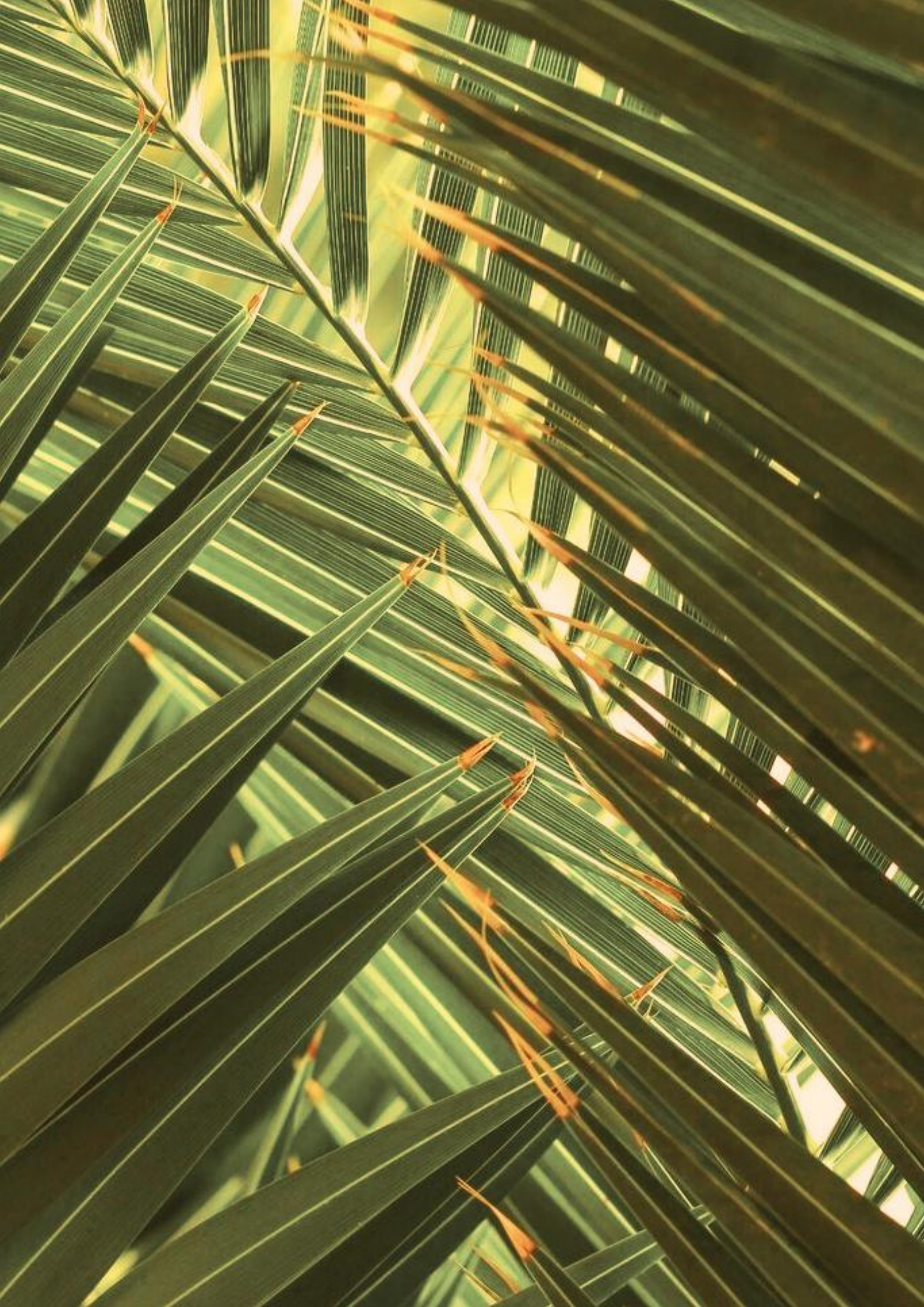
SYMPOSIUM

TOWARDS SUSTAINABLE BUILT ENVIRONMENT IN OMAN

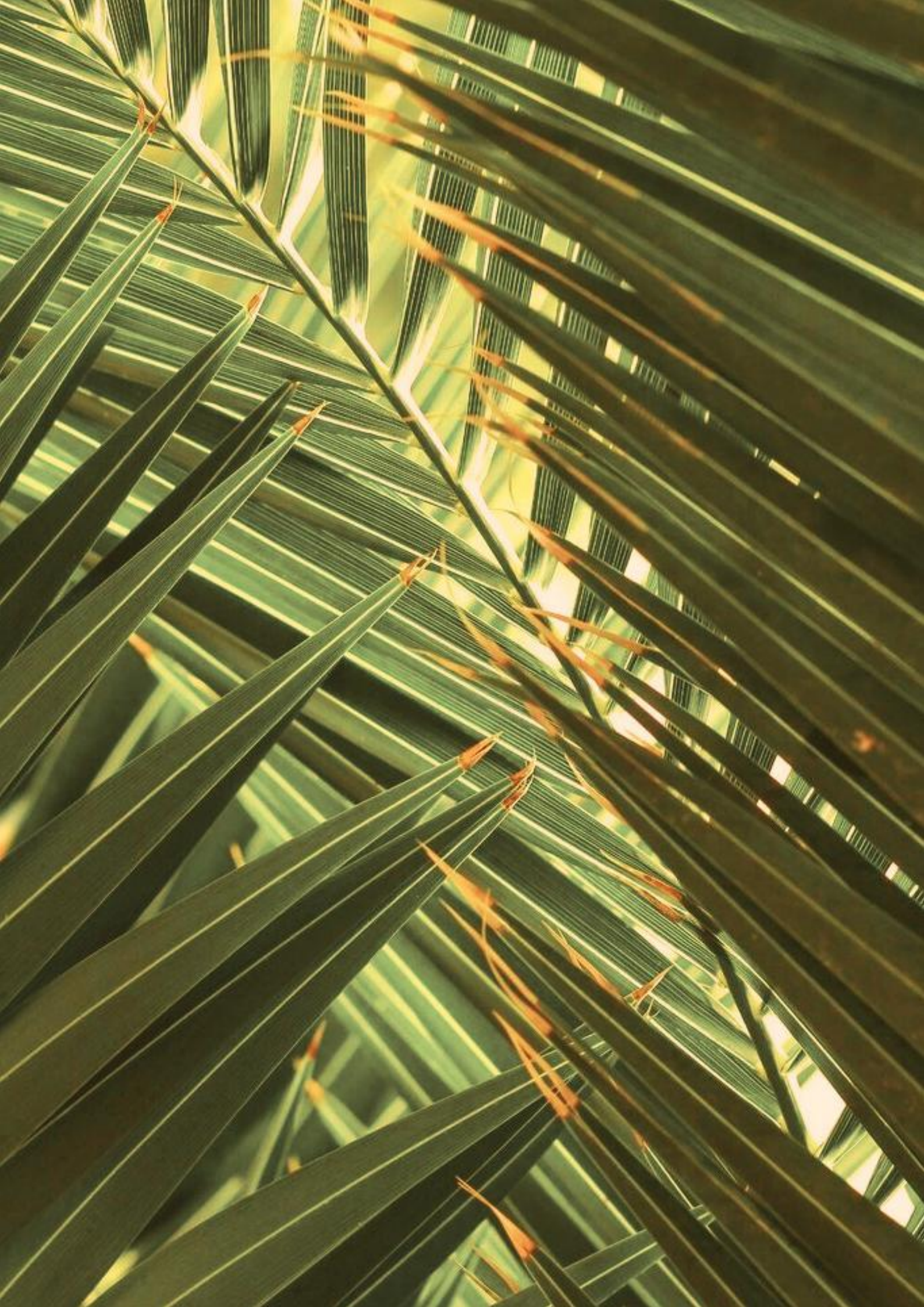
1ST & 2ND MAY, 2024 | MILLENNIUM RESORT SALALAH

CAE-TSBEO SYMPOSIUM 2024



“Protecting the environment and preserving its various natural resources are among the priorities of the developmental plans in the Sultanate of Oman. This reflects our firm belief that caring for the environment and its resources is a global responsibility that transcends the political borders of nations. The international community must ensure the availability of all possible means to protect the ecosystem, conserve its natural resources, and develop action plans to achieve the goals of sustainable development at national, regional, and international levels. It is essential to raise awareness about the importance of maintaining environmental balance and investing in its resources to achieve development and ensure sustainability for future generations... “

His Majesty Haitham Bin Tariq
November 2021



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TOWARDS SUSTAINABLE BUILT ENVIRONMENT IN OMAN

Oman vision 2040 outlines the country's strategic future. It adopts a focused approach to safeguarding environmental sustainability in Oman.

OVERVIEW

Overview

The Civil and Architectural Engineering Unit at the University of Technology and Applied Sciences-Salalah hosted a symposium titled "Towards a Sustainable Built Environment in Oman," under the patronage of His Excellency Dr. Ahmed bin Mohsin Al-Ghassani, Chairman of Dhofar Municipality. The symposium aimed to raise awareness about the sustainability of the built environment in alignment with Oman Vision 2040.

The event emphasized the importance of sustainable practices in urban development and their impact on society. Over two days, the symposium featured presentations of research papers by academics, professionals, and students, alongside a student design competition, project display, and exhibition.

Objectives

1. Promote Sustainable Practices:

Raise awareness about the importance and societal impacts of sustainable built environments in alignment with Oman Vision 2040.

2. Highlighting Research and Innovation:

Present research findings and reviews, and highlight sustainable practices through a student design competition, project display, and exhibition.

3. Facilitate Collaboration:

Create a platform for dialogue and networking among stakeholders in civil and architectural engineering to advance sustainable urban development.

Key Focus Areas

- Climate-responsive design in Oman
- Smart building in achieving a sustainable approach in Oman
- Sustainable Construction Materials & Practices
- Latest sustainable technologies in the Construction Industry
- The impact of a sustainable built environment on society

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Message From
Assistant Vice-Chancellor

Dr. Ahmed Ali Al Shahri

Assistant Vice Chancellor for Salalah Branch
University of Technology and Applied Sciences

In light of the growing concern for urban and environmental sustainability issues, which are among the foremost challenges facing modern societies, the symposium "Towards a Sustainable Built Environment in Oman" organized by the University of Technology and Applied Sciences in Salalah, represented by the College of Engineering and Technology, aims to enhance awareness about the importance of preserving the environment and natural resources. It also encourages the exchange of knowledge among academics, researchers, and experts in the field of urban sustainability, and seeks to draw attention to practical and sustainable solutions that can be applied in reality.

This gathering of academics, experts, and stakeholder presents an opportunity to build collaborative networks that support research and studies related to urban sustainability, highlight innovative technologies in the field, and showcase the challenges and opportunities the world faces in this regard.

In this context, the country's efforts to achieve Oman Vision 2040 include a range of policies and measures, such as raising environmental awareness, promoting the use of renewable energy, and improving the efficiency of natural resource use. The Sultanate also places special emphasis on developing green infrastructure and enhancing sustainable urban development in cities and urban areas.

Oman's commitment to achieving net-zero emissions and sustainable urban development reflects its serious dedication to preserving the environment and ensuring sustainable development for current and future generations.

Urban and environmental sustainability is a vital issue requiring continuous focus and effort from both academic and industrial institutions. It is not merely an environmental responsibility but a national strategy aimed at achieving sustainable development and preserving the urban heritage for present and future generations.

The University of Technology and Applied Sciences in Salalah recognizes that environmental and urban challenges require creative thinking and innovative solutions. The university spares no effort in encouraging its students and faculty members to innovate and develop research projects aimed at achieving sustainability in various aspects of life. This is achieved by providing the necessary resources and support to stimulate innovation and scientific research in the field of sustainability. The university also believes in the importance of fostering a culture of sustainability in our academic and social communities, considering it an integral part of our responsibility towards society, the environment, and urban development.

We are here today to collectively contribute to building a better future; your commitment to participating in this event reflects your desire to effect positive change and help make our world more suitable for current and future generations. We are confident that the success of this seminar will enhance awareness and positive engagement with sustainability issues, paving the way for positive developments towards a more prosperous future for all.

Dr. Ahmed Ali Al Shahri
Assistant Vice Chancellor for Salalah Branch
University of Technology and Applied Sciences

Message From Symposium Director

Dr. Said Omar Al-Mashikhi

Head of Engineering and Technology Department - Salalah

This year marks another milestone for the College of Engineering and Technology as it hosts a symposium that is geared towards sustainable built environment in Oman.

Oman Vision 2040, under priorities related to economy and development, one of the objectives is" an efficient settlement hierarchy to guide sustainable urban development, accommodate the growing population and provide the necessary public services and utilities.".In response to this objective, the engineering sector, particularly the civil and architecture specialists, play a pivotal responsibility.

The concept of built environment encompasses human-made designs, infrastructures, layout of communities and their facilities, the roads and bridges, water, electricity, transportation and other distribution systems that impact our lives.

Built environment develops with population growth, industrialization and modernization and faced with evolving challenges of global climate change, sustainable energy and environmental sustainability. Urban development involves interdisciplinary perspectives as built environment is not only about designs, but how these influence people's lives, experiences and societies. This symposium serves as a platform for researchers, students, engineers and academics to foster collaboration, share updates on industry advancements and promote innovation in the field of engineering and architecture. We thank our generous sponsors and industry partners for their strong support.

Dr. Said Omar Al-Mashikhi
Head of Engineering and Technology Department - Salalah

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KEYNOTE SPEAKERS

Dr. Saleh Al-Saadi

Director of Sustainable Energy Research Center
Department of Civil and Architectural Engineering
Sultan Qaboos University

Keynote Speaker 1

Dr. Saleh Al-Saadi, the Director of the Sustainable Energy Research Center at Sultan Qaboos University and a faculty member in the Department of Civil and Architectural Engineering, presented a groundbreaking research paper at the symposium. His paper, titled "Sustainable Design Solutions to Achieve Net-Zero Energy and Carbon Neutrality in the Building Sector in Oman," delves into innovative strategies for enhancing energy efficiency and achieving sustainability in Oman's construction industry. The presentation outlined key areas such as current energy consumption patterns, associated costs, and the underlying motives driving sustainable initiatives.

Dr. Al-Saadi highlighted the significant potential for energy efficiency in buildings through nearly/net-zero energy building (nZEB/NZEB) design strategies. He supported his arguments with case studies of ecohouses, schools, and mosques in Oman, providing practical examples of sustainable design implementation. The presentation concluded with comprehensive insights and actionable solutions aimed at fostering energy-efficient and carbon-neutral building practices in Oman.

Dr. ALI RAFEET

Assistant Professor of materials and structures
Unit of Civil and Architectural Engineering
University of Technology Applied Sciences-Salalah

Keynote Speaker 2

Dr. Ali Rafeet, an Assistant Professor of materials and structures at Civil and Architectural Engineering Unit - UTAS Salalah, He presented his research titled: "Valorization of Local Industrial Wastes/By Products To Replace Portland Cement in Concrete" His presentation commenced with an overview of traditional Portland Cement Concrete, setting the stage for a discussion on Alkali Activated Concrete (AAC) and its significance as a sustainable alternative.

Dr. Rafeet highlighted the potential of various local industrial wastes and by-products in Oman to serve as precursors for AAC, underlining the environmental and economic benefits. He shared the latest findings from AAC research , demonstrating the promising performance and feasibility of these materials. In his concluding remarks, he emphasized the importance of innovative approaches to sustainable construction, inspiring attendees to consider the broader implications for the future of the industry.

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RESEARCH PAPERS PRESENTATIONS

The research papers presented align with the themes of the conference, with participation from eight academic researchers and six student researchers from various academic institutions in Oman. These included branches of the University of Technology and Applied Sciences, researchers from the Scientific College of Design, and researchers from Dhofar University.

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PROJECT EXHIBITION

His Excellency the symposium Patron Dr. Ahmed Mohsin Algassani inaugurated the student projects exhibition, which featured projects from architectural and civil engineering disciplines, such as the redevelopment of the Al-Hafah neighborhood, the humanization of the historic Mirbat Souq, and the Salalah Dry Port Project.


Students Projects

COMPETITION

The competition aimed at evaluating the participants' skills in design, the capabilities of using computers for geometric visualization, critical and creative thinking, and logical reasoning. Five competing teams from different institutions in Oman presented a preliminary design for a sustainable bus station in terms of construction and operation.

The team from Dhofar University won first place, while the team from the University of Technology and Applied Sciences in Salalah secured second place.

BOOK OF ABSTRACTS

Dhofar University Ecohouse: Engineering Applications toward Environmental Sustainability

Mahaad Issa Shammas[a] *

[a]Department of Civil and Environmental Engineering, College of Engineering, Dhofar University, Salalah, Oman.

ABSTRACT

The Eco-House Engineering project at Dhofar University is an architectural milestone, redefining environmental sustainability in a challenging climate. Traditional construction methods in Oman lead to excessive energy consumption for climate control. This project meticulously assessed the Eco-House's engineering systems with a dual objective: ensuring occupant comfort while minimizing energy consumption. An extensive analysis of Accumulated Solar Radiation (ASR), Average Relative Humidity (ARH), and Average Atmospheric Temperature (AAT) over various months has unveiled encouraging prospects. Consistently high ASR levels indicate substantial potential for sustainable energy generation, reducing reliance on conventional climate control. Variable ARH and AAT underscore the adaptability of the Eco-House's systems, effectively accommodating occupants in ever-changing conditions.

The Eco-House Engineering project seamlessly integrates human ingenuity with natural resources, resulting in a sustainable and ecologically responsible living environment. It serves as an inspiration to the construction industry, pointing the way to a more sustainable future where our constructed environment harmonizes with the natural world.

This study uncovers noteworthy temperature variations within the DU Eco-House over different months and their implications for occupant comfort and daily activities. In July 2013, significant ASR fluctuations influence indoor temperatures. The exceptionally high ASR on the 7th day creates a warmer indoor environment, potentially reducing the need for artificial heating. Conversely, on the 5th day, the ASR drops, possibly requiring additional climate control. The AAT remains steady, ensuring comfort for both staying and working, as abrupt temperature swings can be discomforting and inefficient.

In August 2013, ASR fluctuations necessitate adaptive temperature control systems, while stable AAT values guarantee comfort. February 2014 demonstrates consistent ASR, ensuring stable indoor temperatures and comfort. March 2014's data reveals high and stable ASR, reducing the need for additional climate control, with varying AAT suggesting the need for adaptive temperature control.

The DU Eco-House underscores the importance of adaptive temperature control systems to maintain comfort during daily activities. While AAT data indicates more stable and comfortable conditions during February and March, variations in July and August require the use of such adaptive systems. These findings provide crucial insights for optimizing the eco-house's performance in daily activities, contributing to environmental sustainability and occupant comfort. The DU Eco-House epitomizes harmonious coexistence with nature while mitigating energy consumption.

Keywords: Eco-friendly house; eco-future; greenhouse effect; reduction emission.

* Corresponding Author, (Mahaad Issa Shammas, mahad@du.edu.om and +968 23237340)

Avoiding the Dogma:
Rethinking the Concept According to Oman

Dr. Ossama Hegazy [a]*

[a] **Scientific College of Design, Airport Heights – Matar Street, Muscat, 114 Matrah, Sultanate of Oman**

ABSTRACT

The Oman Vision 2040 Implementation Follow-up Unit (n.d) declared that, His Majesty Sultan Qaboos, may his soul rest in eternal peace, directed to develop Oman "in light of broad societal consensus and with the participation of all segments of society." Thus, the aspect of social sustainability, including societal acceptance and engagement, remains an essential cornerstone to kick off towards a comprehensive and long-lasting sustainable built environment in Oman; the designated conference topic.

This contribution investigates the strategies of making cities more sustainable through addressing three issues, which should be socially avoided during the desired sustainability conversion. First, the research reveals the misleading conceptual dogma of designers, especially when executing their technical approaches —that is via analyzing the manuals of Le Corbusier, the key modernism architect and urban planner. Then, the work of Henri Lefebvre, Right to the City, will be deliberated based on the Omani context. The reflection targets the prevention of creating "lived spaces" that don't correspond with the official sustainable vison, the "conceived space." At the end, via referring to Mark Gottdiener, analyzing the various socio-semiotic morphological levels of significations in cities will help predicting the immaterial connotative interpretations of local communities regarding the intended material sustainability measures.

The proposal at hand presents the aforementioned three challenges, from which the sustainable transformation in Oman needs to deviate and refrain. This paper aims at turning Oman Vision 2040 into reality. However, that is by emphasizing the crucial social concerns, instead of the mere technical ones.

Keywords: Oman Vision 2040; Social Sustainability; Modernism; Right to the city; Placemaking; Socio-Semiotics
Conference theme: Impact of sustainable built environment on society.

* Dr. Ossama Hegazy, o.hegazy@scd.edu.om, 93855086

Waste construction materials for environmental sustainability in Oman

Sivamani Selvaraju[a] **,*, Jayakaran Pachiyappan**[a]

[a]**College of Engineering and Technology, University of Technology and Applied Sciences, Salalah, Oman**

ABSTRACT

The present review paper explores the use of waste construction materials for environmental sustainability in Oman. The construction industry is a significant contributor to environmental degradation, and the adoption of sustainable practices is crucial. Utilizing waste materials such as recycled concrete, reclaimed wood, and recycled plastic offers numerous environmental and economic benefits. This study examines the properties, applications, and environmental impacts of these materials. Challenges and solutions, including regulatory aspects and economic considerations, are discussed. Future trends and innovations in waste-to-construction processes are also explored. The findings emphasize the importance of integrating waste materials into construction practices to promote environmental sustainability and support environmental goals of Oman.

Keywords: Waste construction materials; Environmental sustainability; Recycled concrete; Reclaimed wood; Recycled plastic

*Corresponding Author (Sivamani Selvaraju, Sivamani.Selvaraju@utas.edu.om and +968 9069 4314)

The effect of incorporating waste foundry sand (WFS) into cement composites as a partial sand replacement on the strength and shrinkage properties

Rathan Raj Rajendran [a]*, Ali Almanjawi [b]*

[a] Senior Lecturer, Civil & Architectural Engineering Section, University of Technology and Applied Sciences, Salalah, Sultanate of Oman.

[b] Assistant Instructor, Civil & Architectural Engineering Section, University of Technology and Applied Sciences, Salalah, Sultanate of Oman

ABSTRACT

Solid waste disposal is a big environmental issue that poses serious risks to our planet. Reusing and properly disposing of these materials is crucial. As many industries' by-products and waste products continue to grow, solid waste management has emerged as a pressing global issue. According to Oman's 2040 sustainability vision, solid waste management is a primary priority. Using these elements in cement composites and concrete not only helps to keep costs down but also lessens waste management worries. Waste foundry sand (WFS) is an example of an unwanted industrial by-product. The manufacturing of ferrous and nonferrous metal castings generates a by-product known as waste foundry sand. Foundry sand's physical and chemical qualities are influenced by the casting techniques and industries used. In a foundry, the sand is recycled and reused several times. Waste foundry sand is sand that has been taken from a foundry after reaching the point where it can no longer be utilized. Numerous research and published findings indicate that replacing fine aggregate with WFS improves the durability and mechanical strength of concrete. Additionally, concrete made with WFS as a partial replacement for fine aggregate is strong, lightweight, and long-lasting. This experimental work aims to study the impact of waste foundry sand on cement mortar properties by replacing it with fine aggregate up to 40%. Various tests were carried out to study the material properties, strength, and shrinkage properties of cement mortar. According to the research findings, replacing foundry sand improves the cement's strength and shrinkage qualities to a certain amount, while simultaneously lowering slump values as replacement levels of waste foundry sand increase.

Keywords: Waste Foundry Sand, Cement Composites, Strength, Shrinkage

* Corresponding Author: Dr. Rathan Raj Rajendran,
Rathan.Raj@utas.edu.om
+968 92076351

Green Horizons: Students' Perspectives on Innovative Approach for Sustainable Environment in Oman

Engr. Gerry A. Manglicmot
gerry.manglicmot@utas.edu.om
+96879015684

University of Technology and Applied Sciences – Al Musannah, PO Box 191
Al Musannah 314, Oman

ABSTRACT

One of the pillars of Oman Vision 2040 is the establishment of a sustainable environment. Specifically, Oman aims to create an environment that ensures a balance between environmental, economic, and social requirements according to sustainable development guidelines. This further means that Oman must consistently take proactive measures to keep pace with the fast-moving global trends. Along this vein, higher education institutions (HEIs) in the Sultanate have embarked on various academic program enhancements, including adding courses on sustainable development, renewable energy, and other courses/topics deemed relevant and appropriate. On top of these, the nation and the academe continue to explore and create different avenues to promote students' awareness and involvement in achieving this national priority – creating a sustainable environment. Various research grants, forums, collaborative projects, and similar undertakings to promote a sustainable environment are also made available for the Omani youth. These initiatives underscore the critical role of the young generation, specifically the students, in nation-building and advancing the nation's call for achieving the Oman Vision 2040. As highlighted by HE Sultan Haitham Bin Tariq Al Said in his speech during the 52nd Oman National Day celebration on 11 January 2022, empowering the youth is paramount in nation-building. In his remarks, he stated that the government prioritizes the youth's engagement, recognizing their contributions and organizing their role in societal service. These declarations highlight the significance of ensuring the youths' maximized awareness on national priorities for sustainable progress so they can contribute better to achieving the pillars of Oman's desired future.

Through a qualitative research method using a survey tool, this study seeks to explore the level of awareness of students in Oman regarding innovative approaches for promoting a sustainable environment as part of the Oman Vision 2040 initiative. With growing concerns about environmental degradation, climate change, and the enhanced efforts of the Sultanate in achieving a sustainable environment, it is imperative to understand how knowledgeable and engaged the younger generation is with sustainability practices. It is worth noting that these young people are the country's future leaders whose contributions to national progress and development are critical in steering Oman towards 2040. This is to say that their level of knowledge about the different approaches to creating a sustainable environment plays a pivotal role in achieving such a future state. Moreover, the findings of this study will help identify possible interventions the academe can implement to ensure maximum awareness of students on innovative approaches for environmental sustainability and better prepare them to take an active role in nation-building.

Keywords: sustainable environment, innovative approaches, technologies, sustainable practices, sustainable development

An assessment of energy performance of a building based on its orientation and geometry.

Aravamudhan Arumugam Swaminathan [a]*, Deiveegan Ramasamy [b]*

[a]Lecturer, Civil and Architectural section, Engineering Department, University of Technology and Applied Sciences, Salalah 211, Oman.

[b]Lecturer, Civil and Architectural section, Engineering Department, University of Technology and Applied Sciences, Salalah 211, Oman.

ABSTRACT

Oman 2040 has a vision to rationalize the energy consumption to achieve energy security. Nearly 40% of generated energy is consumed by the building sector to keep the occupant in comfort zone. The energy performance of a building is influenced by various factors such as climate, building orientation, building envelope materials, occupancy patterns, building geometry, etc. Many researchers have established that appropriate building geometry and orientation helps to improve the energy performance of a building.

This study aims to analyze and compare the impact on energy consumption with respect to orientation and geometry of buildings in the warm humid climate of Salalah, Oman.

Research explores the three types of buildings (Say A, B and C), which comprise of ground floor and first floor. Building A is a rectangular building, whereas building B has a square floor plan and building C is also square in plan but with an enclosed courtyard. All the buildings were assumed to have the same area and same window wall ratio.

A rectangular building with its longer sides facing north - south with 26% window wall ratio is taken as the base case scenario. The 'Energy Plus Weather' file of Salalah has been used to analyze energy consumption and the air-conditioning load on the base case scenario using Open Studio plugin in Sketchup Program. Further, the base case scenario is rotated from 0° - 165° N and for every 15° rotation, its impact on air-conditioning load is assessed to arrive at the optimum orientation for reduced air-conditioning load. The two other forms, a square building and a building with courtyard with same floor area and the window wall ratio were also analyzed for 0° - 165° N orientations and their impact on air-conditioning load is assessed.

The results of the simulation were compared to identify the optimum building form and optimum orientation for reduced air-conditioning load. Overall, the study found that the square geometry with 75°N & 165°N as the best built form with least air-conditioning load. Also, for the rectangular form with 0°N & 165°N could be a best built geometry and orientation. In addition, the study found that 165°N orientation performed best for all types of geometry.

Furthermore, there is a significant relationship between building geometry and orientation with air-conditioning load in buildings. The air-conditioning load can further be reduced by several other parameters, if appropriately used in buildings.

Key Words: Energy performance, orientation, building geometry and simulation.

* Corresponding Author, Aravamudhan Arumugam Swaminathan, aravamudhan.swaminathan@utas.edu.om +968 9813 5847

Determinants of visual comfort in Alhafa district, an AI based analysis

Fatemeh Khozaei *, Steven Jay Sampliner, Abbas Hassan, Lamiaa Mustapha, Muna Hassan Ahmed Tabook

Department of Architectural Engineering, College of Engineering, Dhofar University, Salalah, 211, Sultanate of Oman
Department of English language, College of Art and Applied science, Dhofar University, Salalah, 211, Sultanate of Oman

ABSTRACT

The main purpose of this study is to identify the factors affecting visual comfort in the architectural spaces of Alhafa district with an emphasis on traditional construction materials and techniques. It aims to study how all these elements affect the way we see and feel our surroundings. We performed a content analysis amongst 50 images of Alhafa showing in Salalah with the help of an AI-based tool ChatGPT-4 for exploring the phenomena under study. The pictures captured beautiful architectural elements, including arches, stone walls, and wooden beams. Using a systematic review, we reported a comprehensive evaluation of cross-sectional studies on its relationship to indoor comfort based on architectural and psychological specifications, giving details of light intensity, texture variations along tonal patterns, colorimetric values, and their contribution to visual comfort. Results indicated that the utilization of natural elements, such as wood and stone effects, with greater layout transparency would enrich visual comfort. The lack of direct artificial lighting and choice of earthy hues further help in making these spaces visually charming and psychologically soothing. Having arches is a winning aesthetic formula, providing depth and openness, which are integral to making the users feel comfortable. The repetitive use of architectural elements in design helps maintain visual order and rhythm, soothing the occupants. We draw attention to the importance of naturally-derived architectural elements in modern urban design, serving as a reminder that these traditional comforts may be reintroduced with ease.

Keywords: Social comfort, Alhafa, AI Analysis, Traditional architecture

* Corresponding Author, (Dr. Fatemeh Khozaei, fatemehkhozaei@du.edu.om and +96879281881)

PUNCHING SHEAR OF CONCRETE FLAT SLABS REINFORCED WITH FIBRE REINFORCED POLYMER BARS

Abdulhamid A.Q Al Ajami, Ashraf Ashour, Dennis Lam, Therese Sheehan
University of Bradford, Bradford, West Yorkshire, BD7 1DP, UK

ABSTRACT

Steel and concrete have become the most dominant elements in the building structure since these are the most suitable materials to meet the increasing demand for infrastructure. However, both steel and concrete suffer different forms of deterioration. One of the main forms of RC degradation is steel corrosion. On the other hand, steel manufacturing is one of the most significant parts of global CO2 emissions. According to Carbon Brief, steel products are estimated to be responsible for 11% of all CO2 emissions.

In recent years, civil engineers have raised concerns about the durability of RC structures. As a result, it has been given increasing attention to advanced composite materials for reinforcing, strengthening, and rehabilitating existing and new civil engineering constructions. The key advantages of composites (Fibre reinforcement polymers (FRP)) over other traditional materials are their low density, which decreases the cost of handling and transportation and high specific strength (tensile strength of FRP approximately two to three times that of steel). In addition, Fibre reinforcement polymers are non-corrodible materials used instead of conventional steel. They have been approved as an effective way to overcome corrosion problems, making them a sustainable material in the construction field. In most cases, FRP can have a higher tensile strength but a lower tensile modulus of elasticity than conventional steel bars.

This investigation aimed to showcase a study examining flat slab specimens reinforced with glass fibre reinforced polymer (GFRP) and steel bar materials for punching shear behaviour. Six full-scale two-way slab specimens were constructed and tested under concentric load up to failure. One of the main objectives is to study the effect of reinforcement spacing with the same reinforcement ratio on the punching shear strength. In addition, two other parameters were considered: slab depth and compressive strength of concrete.

The parametric investigation revealed that the effective depth has the most substantial impact on the load carrying capacity of the punching shear, followed by the reinforcement ratio, and the compressive strength of the concrete.

Keywords:Punching shear, glass fibre reinforced polymer bars, flat slab

* Corresponding Author: (Dr Abdulhamid Al Ajmi, Abdul.AlAjami@utas.edu.om, Contact no: 99385231)

RECOMMENDATIONS AND CONCLUSION

RECOMMENDATIONS

- Include studies on sustainability in higher education curricula.
- Expecting the Oman Building Code to include the energy-efficient targets of Oman Vision 2040.
- Raise community and stakeholders' understanding of green ideas and sustainable materials.
- Start the process of lowering the cost of acquiring sustainable materials and technologies.
- Promote research on environmentally friendly materials and technology.
- Encourage student activities including project contests and study on sustainable features to better reflect Oman youth's Vision 2040.
- Create net zero energy buildings by analyzing the energy demands in both new and existing structures.
- Establish efficient waste management strategies for construction materials to foster environmental sustainability within the construction industry.
- Conduct research on the thermal behavior of green facade in various Dhofar climate scenarios to give architects and building engineers useful design tools.
- Use more hands-on, interactive teaching strategies in higher education institutions in order to effectively involve students in environmental issues and foster in them a sense of responsibility for protecting the environment and natural resources.
- Taken into account the microclimatic conditions of the environment for any upcoming construction projects.

CONCLUSION

The Civil and Architectural Engineering Unit at UTAS-Salalah organized the CAE-TSBEO Symposium, and its recommendations hold significant implications for academics, industry leaders, researchers, and innovators. The symposium's goals were successfully achieved, generating awareness among attendees, who participated enthusiastically and in large numbers. The insights gained from the event will significantly enhance the knowledge base of the participants and the broader community.

Implementing these recommendations will be crucial to the global efforts to make Oman and the world more climate-responsive and sustainable in the future.

The outcomes of the symposium will assist policymakers in developing effective, efficient, and sustainable policies, enabling them to make better-informed decisions. Innovators can use these suggestions to continue developing new methods and technologies that align with Oman's Vision 2040.

Researchers must identify new research areas and contribute to advancing sustainable built environments. Educators and administrators can adopt these recommendations to design modern curricula that encourage students to explore and critically engage with eco-friendly building materials and technologies.

Lastly, industries can apply these recommendations to improve their sustainability practices and create profitable ventures that benefit society. By collaborating and adopting a holistic approach, stakeholders can significantly reduce the environmental impact of the built environment and pave the way for a more sustainable future.

“The strength of the team is each individual member. The strength of each member is the team.”

APPRECIATION

The organizing committee extends its heartfelt gratitude to the sponsors, supporters, speakers, participants, and the technical and administrative team. Your continuous support and significant efforts have clearly contributed to the success of this symposium.

We would also like to express our special thanks to Dr. Ahmed Ali Al-Shahri, Assistant Vice Chancellor for Salalah Branch, for his significant support in making this symposium a success, and to Dr. Majdi Mohammed Bait Ali Sulaiman, The Deputy Assistant Vice Chancellor for Academic Affairs - Salalah, for his guidance and continuous support.

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Symposium Director

Ar. Ahmed Tabook
Head of Media, Publishing and Visual Content

Dr. Abdul Hamid Al Ajmi
Symposium Co-Director

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