

## **The Mangroves of Shaviyani Funadhoo** **A Student-Led Exploration into Conservation**

Sh. Funadhoo is designated as the administrative center of Shaviyani atoll. Located on the eastern edge of Miladhummadulhu Atoll, Funadhoo Island is geographically positioned at 73°17'23.27"E and 6° 8'58.73"N. Situated approximately 218 km from the capital, Malé, this island is has a domestic airport and features one of the more extensive inhabited landmasses in the Northern Maldives. Adjacently, within the confines of the same lagoon, Farukolhu Island, an almost a mirror image of Funadhoo, exists approximately 1100m to the north. Moreover, Lhaimagu Island, another inhabited island, lies at a proximate distance of 3.80 km.

Historical data over the past five decades indicates that the island exhibits geomorphic stability and has witnessed an increase in its overall size, including the natural amalgamation of an adjacent island to its north. A characteristic feature of the island's coastal morphology includes a vegetated strip proximal to the shoreline, succeeded by a lagoon region.

This lagoonal, locally identified as Dhahfalhu, has evolved into a mangrove ecosystem approximately 0.33sqkm over time. The southern segment of Dhahfalhu, colloquially termed Gamba Kulhi, predominantly consists of a muddy clay substrate and supports a diverse fauna including species such as the Mud crab, Truncated Mangrove Snail, Hermit crab, and Mangrove crab. Additionally, avifaunal species like the grey heron, Great egret, and various other migratory birds frequent this habitat.

Earlier in August, our students were privileged to get the opportunity to undertake an ecological study focused on the mangroves of Shaviyani Funadhoo. These mangroves, with their tangled roots and dense greenery, serve as a vital part of the ecosystem, offering shelter to numerous species and acting as a buffer against coastal erosion. (CONTINUED)

Ahmed Aslam Waheed



The students conducted a comprehensive set of research activities which encompassed:

1. Ornithological Observations: Detailed monitoring of avian species in the region.
2. Biodiversity Assessments: Rapid surveys capturing both plant and animal species.
3. Macrofauna Surveys: Detailed analyses of larger, observable organisms.
4. Microfauna Collection and Observations: concentrated studies on smaller organisms with special emphasis on planktonic species
5. Line Intercept Transects: Systematic studies initiated from the coastal areas extending to the mangrove aquatic interface
6. Sedimentological Studies: Investigations into sediment distribution and its specific characteristics.
7. Soil Quality Analysis: Quantitative assessment of essential elements, encompassing sodium, nitrates, potassium, and phosphorus concentrations.
8. Hydrodynamic studies: Precise measurements of prevailing ocean currents.
9. Topographic Surveys: Profiling of beach morphologies to understand their geophysical characteristics.
10. Oceanographic Measurements: determinations of wave heights, and currents
11. Aquatic Quality Assessments of Mangroves: evaluation of parameters such as pH, Dissolved Oxygen, Total Dissolved Solids, and salinity levels.
12. Anthropogenic Impact Studies: Structured surveys to understand the extent of human influences on the studied ecosystem.
13. Ethnographic Research: Semi-structured dialogues with residents to collate firsthand qualitative data relevant to the ecosystem and its human interface.



Moreover, Funadhoo School students were given a unique opportunity to actively engage in this study. They were led on guided environmental excursions by our student experts in the field, allowing them to witness firsthand the delicate balance of nature within the mangroves. This hands-on experience not only enriched their educational journey but also fostered a sense of responsibility, attachment, and commitment towards conserving their local natural environment.



The primary aim of this study was to gain a deeper understanding of the ecological importance and current health status of these mangroves. Such research is imperative, especially when we consider future development plans for the island. By understanding the intricacies of the ecosystem, one can ensure that any developmental ventures will be undertaken with environmental sensitivity, minimizing harm and preserving the natural beauty and function of these critical habitats.



We thank the Island council of Funadhoo for the support extended to our students in their educational journey. We are optimistic that these learning experiences would leave an indelible mark on their memories.

# “Building Tomorrow: Exploring New Materials in the Construction Industry”

Sarah A. Elgezary

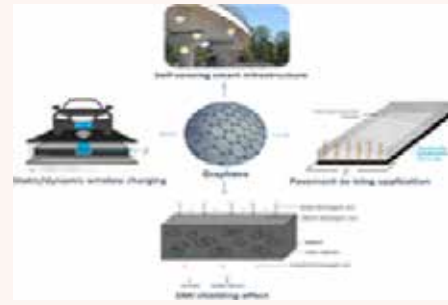


Figure 2 Graphene reinforced Concrete

## INTRODUCTION

In the ever-evolving realm of construction, innovation knows no bounds. The traditional materials that have long defined the industry are now being reimagined and replaced with cutting-edge alternatives that offer enhanced performance, sustainability, and aesthetic appeal. This article delves into the exciting world of new materials reshaping the construction landscape, highlighting their advantages, applications, and the transformative impact they hold for the future. Some of these materials are:

## CROSS-LAMINATED TIMBER (CLT): REVOLUTIONIZING WOODEN STRUCTURES

Cross-Laminated Timber (CLT) is emerging as a game-changer in the construction industry. Engineered by bonding layers of lumber together at right angles, CLT boasts remarkable strength, durability, and fire resistance. This eco-friendly material reduces carbon emissions and construction time while enabling architects to design innovative, tall wooden structures that combine beauty with sustainability.

## GRAPHENE-ENHANCED CONCRETE: STRENGTH AND SUSTAINABILITY UNITE

Concrete, a staple in construction, is being reinvigorated with the infusion of graphene, a groundbreaking nanomaterial. Graphene-enhanced concrete exhibits extraordinary strength, crack resistance, and conductivity. This not only extends the lifespan of structures but also opens doors to applications like self-healing concrete and roads that generate electricity from sunlight.

## TRANSPARENT ALUMINUM (ALUMINUM OXYNITRIDE): WINDOWS INTO THE FUTURE

The once-fantastical concept of transparent aluminum is now a reality. Aluminum oxynitride combines the clarity of glass with the strength of aluminum. This material is finding its way into the construction industry, revolutionizing architecture by enabling the creation of transparent facades, bullet-resistant windows, and protective enclosures that provide enhanced security and aesthetics.

## SELF-HEALING MATERIALS: PROLONGING STRUCTURAL LIFESPAN

The idea of structures that can repair themselves is no longer confined to

science fiction. Self-healing materials, such as concrete with embedded capsules of healing agents, are now being used to extend the lifespan of buildings and infrastructure. These materials autonomously repair cracks, preventing deterioration and reducing maintenance costs.

## 3D-PRINTED CONSTRUCTION: FROM BLUEPRINT TO REALITY

3D printing technology is taking construction to new heights. Large-scale 3D printers can create intricate structures using concrete or other materials, reducing waste and construction time. This method is particularly advantageous for creating complex architectural designs, low-cost housing, and disaster-resistant shelters in remote areas.

## BIO-BASED MATERIALS: MERGING NATURE AND CONSTRUCTION

The push for sustainability has led to the development of bio-based materials derived from renewable resources such as bamboo, hemp, and mycelium (mushroom roots). These materials offer impressive strength, flexibility, and thermal properties, making them ideal for a range of applications, from structural elements to interior finishes.

## CONCLUSION

The construction industry is undergoing a remarkable transformation as new materials redefine the possibilities of design, sustainability, and functionality. From skyscrapers made of timber to self-healing concrete and transparent aluminum facades, these innovations are pushing the boundaries of what is achievable in architecture. As architects, engineers, and researchers continue to experiment with and harness these materials, the future of construction looks increasingly promising, with structures that embody both human ingenuity and respect for the environment. As we stand at the crossroads of tradition and innovation, one thing is certain: the construction industry's evolution is built upon the very materials shaping its path forward.



Figure 1 Cross-Laminated Timber as inspiration for architects



Figure 3 The 3D-printed data center, Heidelberg



## Field trip to Kaashidhoo

Ahmed Fariz Nizar

At the end of the month of August, yet another exciting and educative field trip had been undertaken by a large group of students from the Bachelor of Design in Architecture course. The field trip components ensure that the students gets substantially exposed to the current issues faced by many of the communities in the outer lying islands in the Maldives, and ensures that the students are fully equipped with many of the technical abilities required to assess and respond to real-life situations while practicing Architecture.

The group totaling 59 students comprised of students from Year 1 and senior students from Year 2, travelled to Kaafu atoll Kaashidhoo this semester. The students were accompanied and guided by 3 lecturers throughout the trip. These students from 2 different academic levels were teamed up in mixed groups of up to 15 students for the course of the trip. This is in order to provide opportunity for them to learn from each other and benefit from their unique strengths in a collaborative environment in achieving common goals. Students fulfilled an intense program comprising of field analysis, workshops, and presentations over the course of 7 days.

The joint Deliverable of the field trip was to produce a comprehensive analysis of the island of Kaashidhoo and gain a good understanding of the underlying issues of the island. Each of the groups were assigned individual responsibility over analyzing 2 specific aspects or “topics” concerning the island. Students were seen to broadly cover and delve into a range of topics such as: the natural and physical environment of

Kaashidhoo; the history, heritage and culture of the island; the Demographic characteristics; the livelihood of the people and commerce on the island; and the community facilities and the recreational activities on the island. Additionally, the student groups also studied: the prevalent urban design and arrangement of the island; the quality of urban infrastructure; and the details of housing typologies and building technologies used on the island. On the field, students produced varying types of illustrations to convey their ideas including sketches, collages, and full-fledge drawings which were all supplemented with text and notes. Some students got opportunity to share some of their findings with the island council.

Upon return from the field trip, the junior students will be compiling the analytic work into a comprehensive illustrated Booklet of Kaashidhoo, with additional content revealing

ways to eradicate or improve problems identified during the analysis. The senior students will be showcasing a set of Leaflets that serves as a condensed version - summarizing the findings from Kaashidhoo under the specific topics mentioned earlier. Additionally, both sets of students will base their Architectural Design project for the semester in Kaashidhoo. The Year 2 students would be designing Community buildings, while the Year 1 students shall be designing a house for a specific personality. These conceptual buildings are to be hypothetically placed at specific locations that had been pre-analysed assessed on the field trip, and are required to be contextually sensitive and responsive to the atmosphere and urban dynamics of the island. The final works of the students are planned to be showcased on an exhibition to be held at the end of the semester in December.



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