

## Thilamale bridge: World's tallest pre-cast segments in Long Line casting method to be used for bridge construction



By: Lidiya

As a part of curriculum, Civil Engineering students from semester IV & V had a field visit to Thilamale bridge site in the month of May. The Thilamalé Bridge, officially named the Greater Male' Connectivity – Male' to Thilafushi Link Project, is overseen by The Ministry of Construction & Infrastructure, with Project Management consultancy provided by Arup Maldives Limited and construction undertaken by AFCONS Infrastructure Limited. The bridge will stand as the largest ever constructed in the Maldives and as one of the most substantial construction endeavors in the Greater Male' Region.

The bridge has many construction sites as this was an extremely large project, and we were able to visit two locations. The first location was in Male, serving as the starting point of the bridge at the industrial village. The second location was the casting yard in Gulhifalhu, where the precast bridge components are created and prepared for installation. The total project link was approximately 6.7km in length with three navigation bridges, 3.7km being bridge sections having 140-meter main span across the deep channel between each island, 1.41 kilometers of marine viaduct in deep water, 2.32-kilometer marine viaduct in shallow water or on land, and 2.96 kilometers of at-grade roads.

### Piling

The project staff were tasked with making 25 offshore boreholes, 5 onshore boreholes, an offshore and onshore geophysical survey as well as a topographic and bathymetric survey. Boreholes were drilled at the necessary spots for piles, followed by the placement and concreting of the reinforcement cage. The foundation was cast using concrete of strength C55 and the deck using C40 grade concrete. The reinforcement ranged all the way from 8mm to 40mm. The base of the foundation was cast in 3 stages as the height of the structure was quite large.

### The record breaking Precast Concrete Slabs

Entire bridge is made of precast concrete hollow decks installed on top of deep pile foundations cast using extremely large machinery. Deck installation is carried out using the balanced cantilever method, where segments are sequentially joined and post-tensioned, balancing them left and right from each pier. This process continues until the segments connect with those from the next foundation, forming one section of the bridge. Over 1300 precast segments are required for the entire length of the bridge and around 300 of them have been casted at the time of the site visit.





## Quality Control

A dedicated team in Gulhifalhu oversees the quality of construction works. The laboratory located near the casting yard carries out the testing for the steel, cement, sand as well as the concrete being used for the construction of the bridge. The extensive range of testing equipment includes a compression testing machine (CTM), sieve shaker, aggregate impact value testing apparatus, abrasion testing apparatus, pycnometer for specific gravity, water absorption testing apparatus, rapid chloride migration testing apparatus, and numerous others.



*In a tweet, the Indian High Commission said "bridge's superstructure will stand 8.177 meters tall which holds record for being the tallest precast members in Long Line casting method."*

The most important test in their opinion is the rapid chloride migration test (RCMT). Since the concrete used for the bridge is directly exposed to ocean water, it is susceptible to chloride ion attacks. The RCMT provides a quick and straightforward method for evaluating the concrete's resistance to chloride penetration.

## Challenges Encountered

"High variability in the ground conditions and engineering properties over short distances, presence of voids and significant cavities, was quite challenging. Moreover,



minimal response data was collected regarding the impact of pile usage on the surrounding soil, with the nearest data point being over 2 kilometers away on reclaimed land in Hulhumale"

"Despite discovered cavities, during the investigation, the grouting process revealed that some cavities were twice the initially estimated size, resulting in the need for more grouting materials than originally calculated" -Team members -

*"The most fascinating aspect of this bridge construction is the post-tensioning mechanism where you will learn how these decks are connected using cables & tendons, set to begin in August 2024. You should certainly come and discover this engineering marvel. On behalf of the Ministry of Construction and Infrastructure, I invite you to join us for your next visit."*

*- Mohamed Jinan Saeed (Project Engineer)*



# Immersive Marine Science: FEST Students Use Virtual Reality to Inspire Young Learners

- Dr Zeeniya Kamil -

Final-year Marine Science students from the Department of Environmental and Natural Science recently organized an engaging public event at Kalaafanu School. This initiative, part of their Science and Society curriculum, aimed to educate Grade 7 students on the crucial roles marine animals play in the ecosystem and their importance in scientific research. Additionally, it provided students with the opportunity to hone their skills in effectively communicating complex scientific concepts to school students.

## The Fascinating World of Parrot Fish

The first group captivated their audience with an insightful presentation on parrot fish, highlighting its crucial role in maintaining coral reef health and forming the sandy beaches iconic to the Maldives. They explained how parrot fish sustain the ecosystem by feeding on algae that grow on coral reefs, preventing algae from overgrowing the corals. Additionally, they demonstrated how the sand produced from the digestion of coral by parrot fish contributes to the Maldives' pristine white beaches. The students emphasised the intricate balance of marine life and the critical importance of each species within the marine ecosystem.



*MNU students use a model whale shark to explain its biology and ecological importance, engaging the Grade 7 students with hands-on learning.*

## Interactive Presentations and Virtual Reality Experience

The event featured interactive sessions that allowed Kalaafanu School students to engage more deeply with the material. Using virtual reality (VR) technology, the MNU students provided immersive experiences, enabling the young attendees to explore underwater ecosystems and



*FEST students use a parrot fish model to demonstrate and formation in the Maldives, highlighting the species' crucial role in creating pristine white beaches.*



*FEST students deliver an engaging presentation on the role of parrotfish in maintaining coral reef health, capturing the attention of School students.*

## The Majestic Whale Shark: Key to Marine Biodiversity

The second group focused on the whale shark, the largest fish in the ocean, and its significance in scientific research. They discussed the biology of whale sharks, their migratory patterns, and their essential role in marine ecosystems. The presentation highlighted the importance of conservation efforts and how whale sharks are pivotal for understanding marine biodiversity and ocean health. The group also shared insights into ongoing research projects in the Maldives that study whale shark behavior and migration, emphasizing their global significance in marine research.



*FEST students assist young learners in navigating the VR experience, ensuring an educational and enjoyable exploration of marine habitats.*



*A group of Grade 7 students, fully engaged in a virtual dive, discovers the wonders of marine life through cutting-edge VR technology.*

witness parrot fish and whale sharks in their natural habitats. This innovative approach to using VR technology made the learning experience more engaging and memorable, offering a unique glimpse into the underwater world.

This event showcased the commitment of FEST students to public engagement and education, using modern technology to enhance learning about marine science and conservation.



# Design Dialogues

## Recap of Architectural Critique Sessions at FEST

*Architecture is an art form, but it is also a practical discipline. The buildings and spaces that architects design must function properly and meet the needs of their users. Criticism helps ensure that architects are designing structures that are safe, functional, and well-constructed*

The architectural critique, commonly known as “crit,” remains a cornerstone of our architectural educational process. From June 10th to June 12th, FEST conducted final crit sessions for our semester 1, semester 3, and semester 5 students. Each session, featuring 15 to 20 visiting architects, provided invaluable feedback on student projects.

Students had spent considerable time developing their design projects, including development of conceptual ideas, detailed drawings, models, and digital representations. Preparation was essential, as students needed to clearly articulate their design concepts, objectives, and rationale. During the crit sessions, students presented their work to panels of visiting architects, faculty members, and peers. Presentations included narration of overviews of the projects, highlighting key ideas and significant design elements. Visual aids such as presentation boards, models, and digital representations were crucial for effective communication.

Following each presentation, the critique phase began. Visiting architects provided constructive feedback on aspects like design quality, functionality, sustainability, and contextual appropriateness. This feedback highlighted strengths and identified areas for improvement, fostering an environment of growth and learning.

A vital part of the crit was the interactive discussion that followed the feedback. Critics and students engaged in dynamic dialogues, exploring the designs from various perspectives. These exchanges allowed students to refine their concepts and gain fresh insights. Additionally, students had the opportunity to defend their design choices, showcasing their creative process, critical thinking, and problem-solving skills. Students were encouraged to reflect on the feedback received and integrate these insights into their future work.

The crit sessions were a valuable learning experience for all involved. Students benefited from expert guidance, broadened their understanding of architectural principles,



and developed their presentation skills. For the visiting architects, it was a chance to observe emerging design trends and innovative ideas from the next generation of architects. The crit sessions were more than assessments; they were dynamic, collaborative processes that enriched our students' educational journey. By engaging in thoughtful critique and dialogue, students not only enhanced their design capabilities but also prepared for professional challenges ahead. These crits encapsulate the essence of architectural education, blending creativity with critical analysis, and nurturing the architects of tomorrow.

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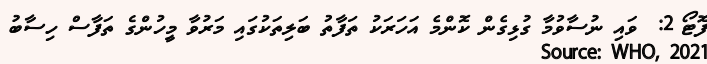
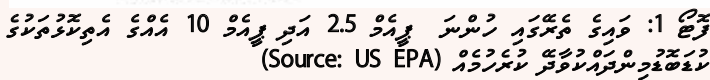
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104 **Unhealthy**  
for Sensitive Groups  
Updated on Monday 14:00  
Temp.: 33°C



Source: <https://smartairfilters.com>

