

reflection

preliminary results of research and design
graduation studio 2024/2025
architectural engineering

Jae Won Choi
Faculty of Architecture & the Built Environment,
Delft University of Technology
Julianalaan 134, 2628BL Delft

The research focuses on the design and development of large-scale floating architecture, with particular attention to energy self-sufficiency, structural stability, and sustainable water management. The project reflects a multidisciplinary approach, combining architectural design with engineering and environmental strategies. It responds to current challenges such as climate change and land scarcity, showing how floating buildings can offer flexible and adaptive solutions.

The proposed design is a floating maritime terminal office located in Hoek van Holland, approximately 3 km offshore. To improve the quality of life for workers, the building also includes accommodation units. Besides serving as an office, the structure functions as a visitor center, restaurant, fish market, and fish shop, taking advantage of its proximity to one of Rotterdam's largest fishing areas. The ground and first floors are open to the public, while the second floor is reserved for office use and private accommodation.

The overall structure adopts a modular hexagonal system, following the pontoon design. Based on tutor feedback, the main structure—including the roof—was developed as a modular system. The columns and slabs are made of timber, while the roof structure uses steel. To improve energy efficiency, the design incorporates glass integrated with photovoltaic cells. Rainwater is collected from the roof of each module and reused primarily for irrigation. The purified greywater is used for toilet flushing or safely discharged into the sea.

The transferability of this project is one of its key strengths. The modular and scalable design can be adapted to other coastal locations with similar environmental and urban conditions. It can also be modified for different uses—such as residential, educational, or cultural facilities—depending on local needs. This flexibility enhances the long-term relevance and potential impact of the project in broader contexts.

One of the major challenges was selecting materials suitable for a marine, salt-exposed environment. Balancing sustainability with durability was difficult. After discussions and feedback, the facade was changed from glass to wood, which is more sustainable and also creates a more welcoming and recognizable appearance. This shift made the building more approachable and helped it stand out as a potential landmark for Hoek van Holland.

Through the project, I learned how to manage complex design problems and gained technical skills in buoyancy modeling and energy flow simulation. I also improved my ability to assess the practicality of architectural ideas in marine contexts. Moving into the final phase, I plan to refine construction details, develop diagrammatic drawings, and prepare a compelling visual presentation using exploded axonometric views.

jae won (june) choi