Reflection

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Studio

Studio Name: MSc 3/4 Graduate Studio 11
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Project Title

Temporary Form-Active Structures
Installations for art, theater, and communal living at the Oerol Festival (NL)

Reflection Aspect 1

Research and Design

The objective of this project was to design temporary *form-active structures* for the Oerol Festival on the Dutch island Terschelling (see research plan and article for more detail). While all the designs share the same form-active physical system, each structure meets the unique requirements of different activities (i.e. shelter, recreation, communal gathering, entertainment (art/theater/music), and outdoor exploration).

Technical research for this project was conducted previously to test and evaluate computational parametric tools for designing such form-active systems. More specifically, the spring-based particle system *Kangaroo for Grasshopper* was used to expedite the design process, focusing on the phases of form-finding and fabrication.

While these techniques aided in testing numerous design iterations with minimal time and effort, they fell short in predicting the precise physical behavior of real materials. Therefore, alternative digital design tools were also researched to assist in form-finding, paneling, and nesting for fabrication. To address these shortcomings, the software *MPanel* was ultimately used in addition to *Kangaroo* in the final designs for the Oerol project.

Reflection Aspect 2
Studio Theme and Case Study

The TU Delft MSc Architectural Engineering graduate studio *Intecture* emphasizes the connection between design and building technology. The studio requires a strong focus on materialization and the technical aspects of building. This requires the expertise of different specialists in a multidisciplinary approach.

The design process for form-active structures is complex due to a codependence of geometry and force. It demands close collaboration between architects and engineers. This differs from the prevalent practice wherein architects largely conceptualize the shape of a building before engineers calculate structural and physical requirements.

In designing form-active structures, the phases of conceptual design, materialization, and fabrication are inherently linked. The key to a successful form-active structure lies in its connections, where all forces come together. In parallel with the focus of the *Intecture* studio, this case study requires careful attention to the pragmatic aspects of performance, safety, constructability, and technical detailing.

Reflection Aspect 3
Methodologies

The *Intecture* studio frames its approach largely by the terms of *context, program,* and *technique,* in addition to *what, how,* and *why*. This guides the organization of the technical research and the design project itself.

For this case study of temporary form-active structures, the technical research began with the *why*. Here, humanity's need for flexible, socially responsive, and environmentally friendly architecture triggered a focus in temporary architecture and, more specifically, in form-active shelters. The *what* materialized as a series of structures built for a festival environment. Further, the *how* comprised the technical solutions generated for each design, largely aided by parametric computational tools. These tools concurrently provided the *technique* which guided the design solutions for various *programs* in the *context* of Duinmeertje van Hee on the Dutch island Terschelling.

Reflection Aspect 4
Social Relevance

Form-active systems can be seen in lightweight shelters built since the start of humanity. Such temporary shelters are in continual use because they are typically lightweight, deployable and easily assembled, disassembled, and transported. During this time of rapid population growth and climate change, form-active systems are particularly economical because they minimize material use.

Today temporary architecture provides opportunities to examine social behavior, test new materials and technologies, and largely inform our future built environment. The output of this research can help guide the design and manufacturing process of form-active temporary structures. The computational techniques researched can be paired effectively with traditional analog design methods to create customized shelters for a wide range of contexts and functions. Ultimately, these methods can help provide built solutions to flexibly handle modern-day threats and climate change.