Wildreed observatory

Harmonizing with nature

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Project name - Wildreed

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Course name - Design informatics AR0138

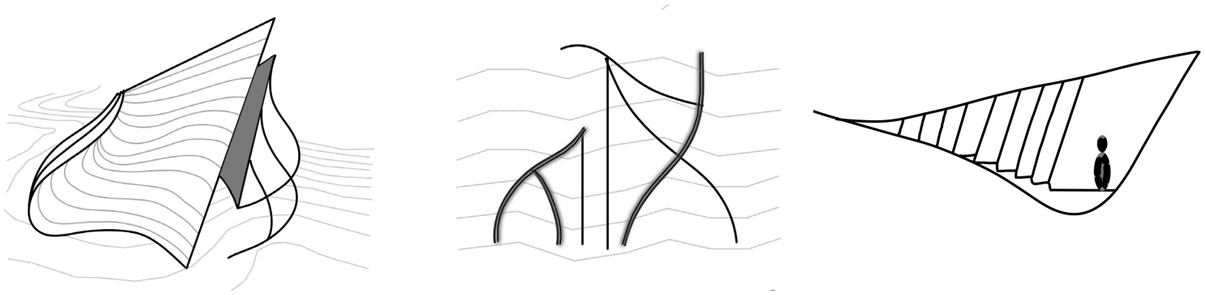
Delft University of technology

Design assignment - Camouflage:
'Concealment by means of disguise'

Date - 20 /04/2023

1.1 Concept

When designing a hideout for observing nature and wildlife, the surrounding topography is being used as a basis for creating a structure that is not bound by traditional shapes or forms. This type of design is referred to as free-form, which is characterized by irregular and smooth curves that have surfaces that can be separated into smaller elements. In essence, the goal is to create a structure that seamlessly blends in with its natural surroundings while providing a comfortable and functional space for observation.



Images showing initial sketches for the concept

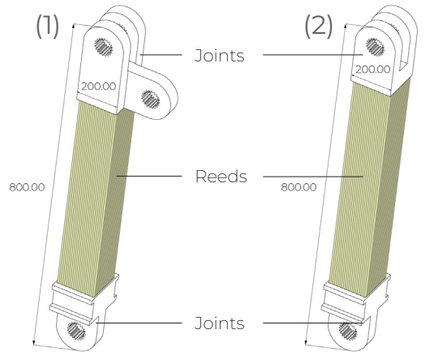
The concept for the nature and wildlife observation hideout involves designing two surfaces that smoothly curve and flow around each other, forming a geometry of **synclastic and anticlastic** curvatures. This geometry will have a single face and will enclose observation spaces in between them. The design elements should mimic the appearance of the wild grass present in the surrounding environment, while also following the contours and curves of the surfaces.

1.2 Site study

The site is located on the seaside nature park between Scheveningen, Wassenaar and Katwijk aan zee. This area is part of the 'Nationaal Park Hollandse Duinen', a national nature preservation park stretching along the coast of South Holland. The aim is to create a structure that seamlessly blends into the natural surroundings, providing a space for the wildlife spotter that is both functional and discrete. By using the contours of the landscape and the appearance of the local flora as inspiration, the hideout will become an extension of the environment, rather than a disruptive presence. The free-flowing, curved surfaces will allow for a unique and immersive experience, with observation spaces that offer a panoramic view of the natural world.

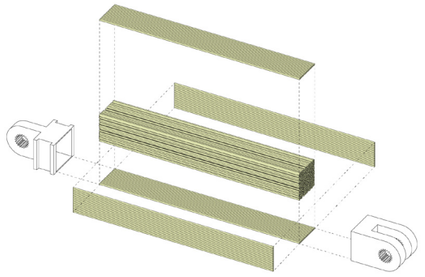
The chosen site location on the vast landscape

1.3 Design of the discrete element



The overall structure is made with a combination of 2 unique discrete elements. (1) is primarily used as a knee brace for the base of the ribs while (2) is repeated across the rest of the structure to create the form.

The use of reeds is strategic here, considering our site's proximity to reed habitats and the fact that they are also biodegradable. When bundled up, they make a strong structure that is often used in some communities to construct shelter.

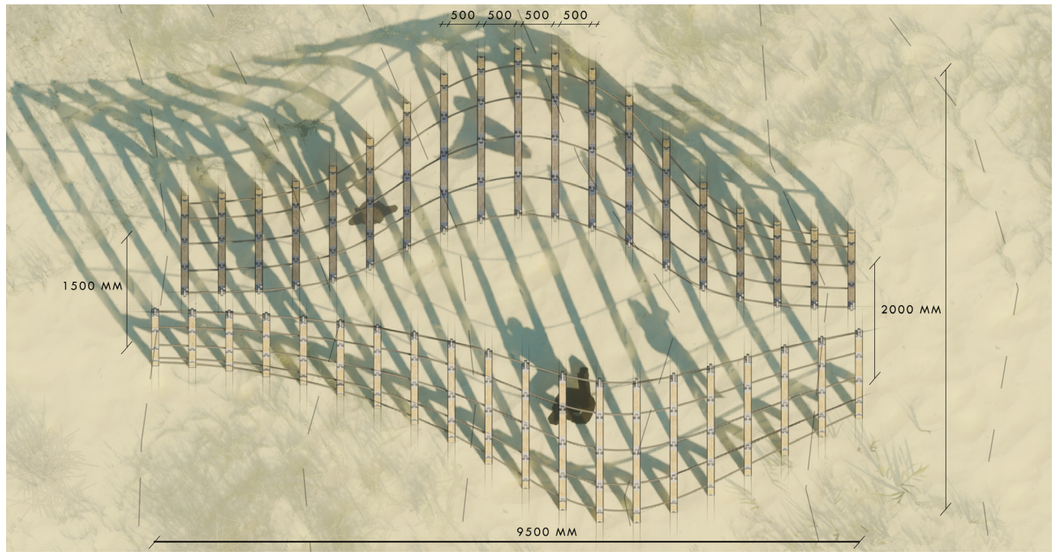


The packing of reeds consists of an outer layer of reeds, taped together to maintain the rectilinear shape of the member and to make it easily detatchable for maintenance. The outer layer can be replaced to keep the inner reeds from degrading overtime. The bundle will be fitted into the joints using bio-based adhesives.

Joints were designed to both connect and remain in place and to be picked up without moving from position. There are 3 unique piece to the joinery. The in-built gears also allow 20 different angles of variations, giving us more freedom in our form.

2.1 Design

View



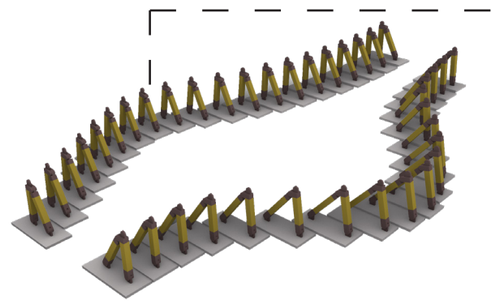
Plan

Front elevation

Side elevation

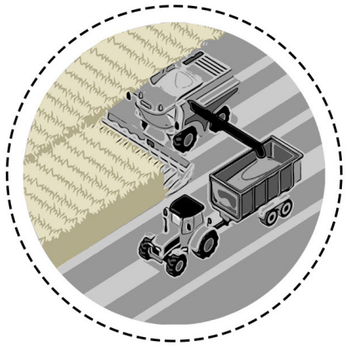
From the drawings above, it is evident how the nature and wildlife observation hideout seamlessly blends in with its surroundings, becoming an extension of the environment. The design of the structure, with curvatures that mimic the curves of the local topography and the wild grass, creates a harmonious relationship between the hideout and the natural landscape.

The materials used in the construction of the hideout also contribute to this sense of integration, with natural finishes such as reeds and natural fibre rope being used to complement the surrounding environment. The design elements have been carefully selected to reflect the unique character of the location, ensuring that the hideout does not feel out of place or disruptive.

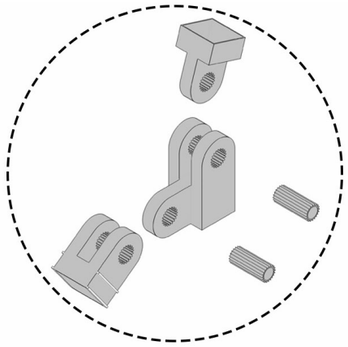


The nature and wildlife observation hideout's reed ribs are anchored to heavy concrete footings that are the same size to prevent toppling during strong winds. The footings provide stability and durability, ensuring the hideout remains safe. To adjust the distance between the reeds, the structure includes a channel that allows the joints to slide over, ensuring the structure remains stable while allowing adjustments to be made to the spacing.

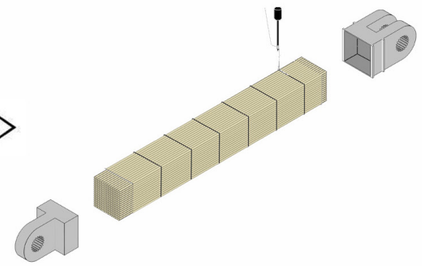
3.1 Workflow



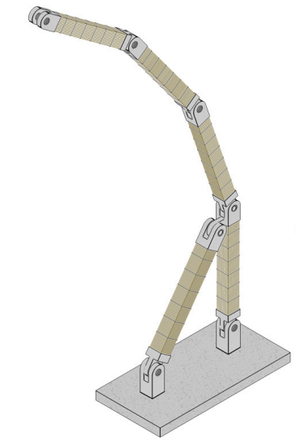
Step 1: *Harvesting the reeds that will be brought to the factory for assembly. Around 8 m² of reeds will be required for the project*



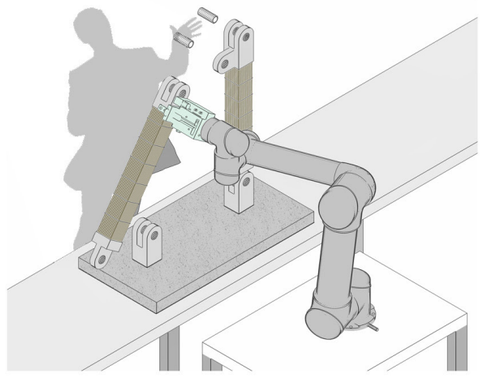
Step 2: *3 discrete joints will be casted as used for assembly. These joints will be made of aluminum*



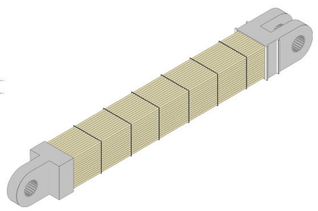
Step 3: *The reeds will be cut to the length of 500 mm and prepared in cuboid bundles of 100 mm by stitching them together.*



Step 6: *Finishing the assembly of the reed ribs so that they can be dispatched to the site.*

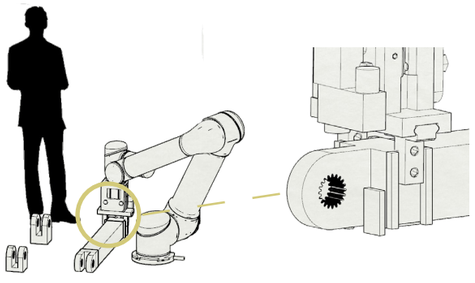


Step 5: *The discrete elements are then assembled together with the help of a robot. Human intervention in the assembly process involves plugging in the lock for the joints, as the robot hold the discrete element in place*

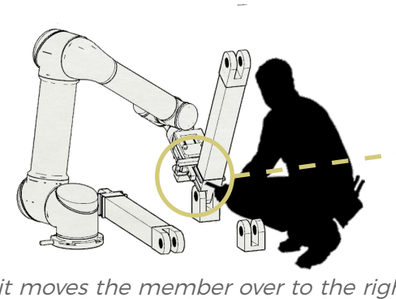


Step 4: *Once the reeds are stitched together with by metal cables, they will be attached to the joint with a bio-based adhesive.*

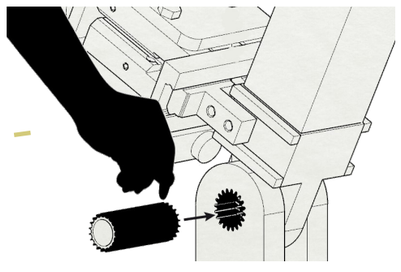
3.2 Assembly method



The robot will pick the member up on one end of the member at the aluminum joints.

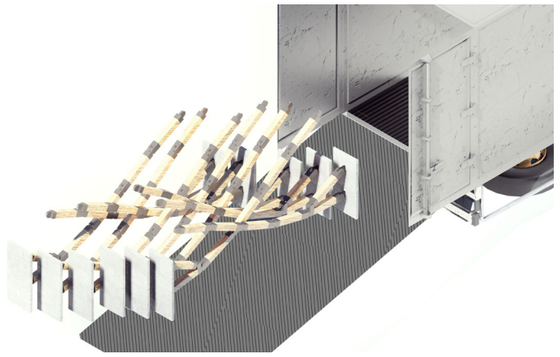


Then it moves the member over to the right position and angle at the overlap of the two joints. Once in place the builder slides the rod in that locks the two members together (see next picture as well.)



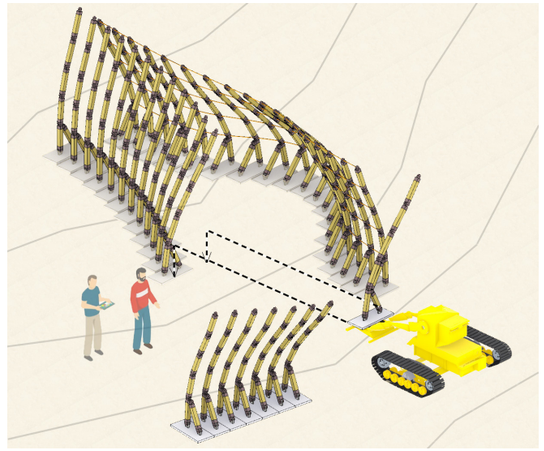
With an input given on the robot itself it then releases the member when locked and moves back over to grab the next member.

3.3 On site assembly

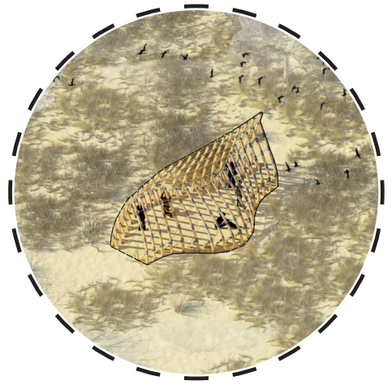


Maximum length : 12.00 m
Maximum width: 2.55 m

Once assembled, the ribs are placed into the truck, along with the concrete foundation, for transport.

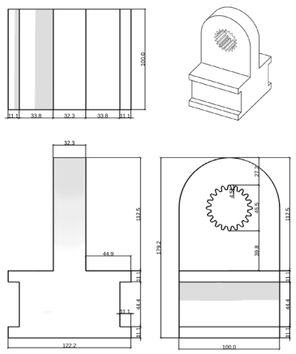


Components are assembled on site with an all-terrain robotic arm. The robot is equipped with cameras and scanners to accurately navigate the environment and identify the location of each component

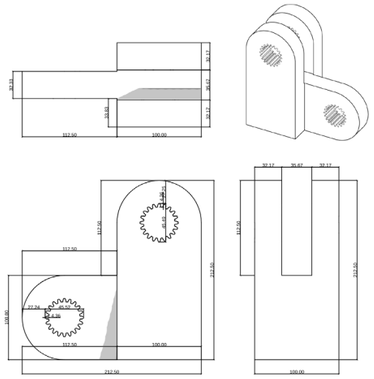


Bird's eye view showcasing the overall site composition. The structure blends with the environment to avoid disruption for birds

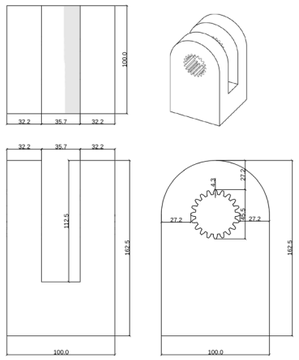
4.1: model 1:2



Discrete element joint 1

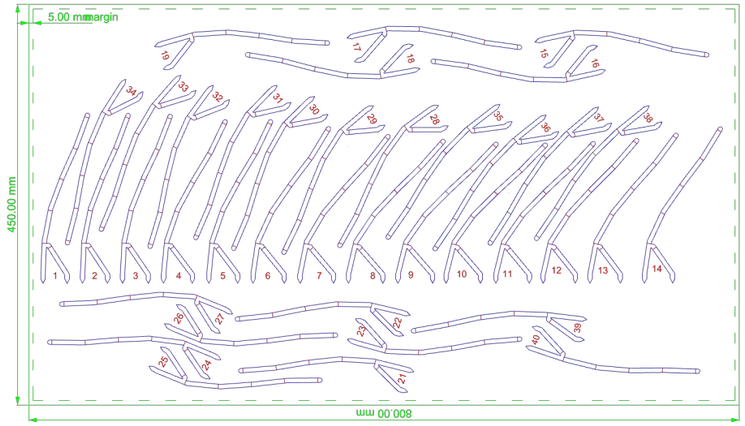


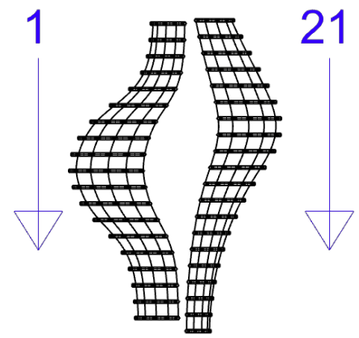
Discrete element joint 2



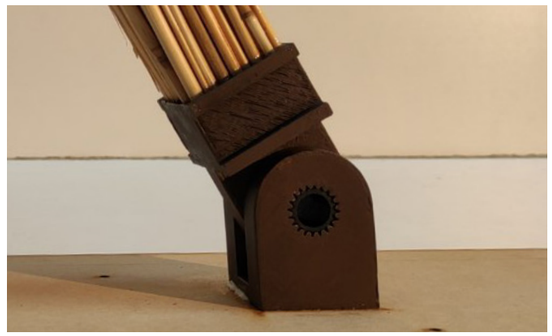
Discrete element joint 3

4.2: model 1:20

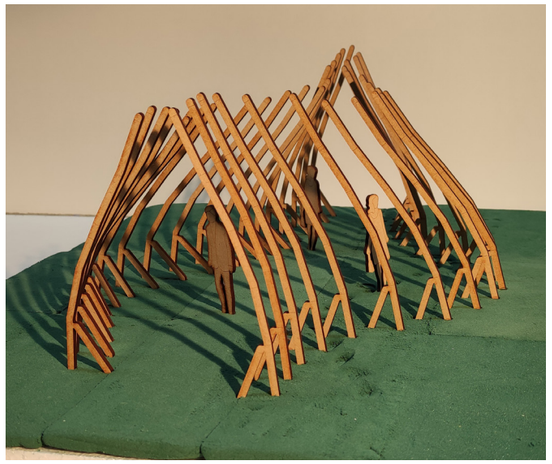


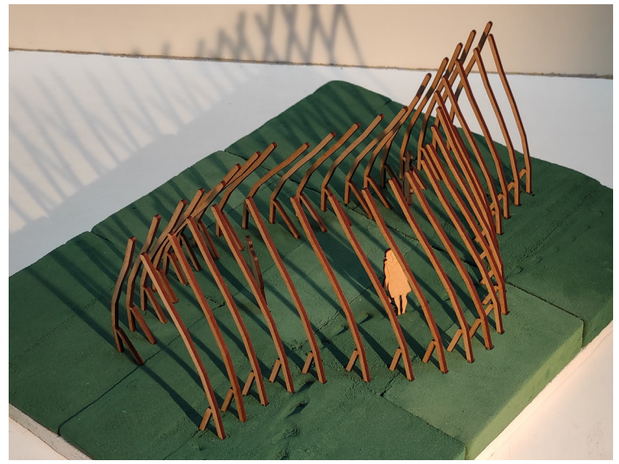


Drawing prepared for lazer cut in an enclosed space of 800mm X 450mm. The material used for ribs in MDF(Medium Density Fibreboard)



*Discrete elements have twp parts. The joints are 3-D printed in **PLA-Black** material after the drawings are extracted from rhino. Once 3-D printed, the reeds are attached to joints using epoxy glue. The elements are then assembled in the lab using a robotic arm.*





The drawings are prepared for lazer cutting 40 individual ribs. These ribs are then carefully inserted into the foam base using a robotic arm. This assembly sequence depicts how each rib will be assembled on the actual site.