

05.SHAPING OF SAND

LOCATION

Conceptual Project

KEYWORDS

Robotics, 3D Priting

INVOLVEMENT

Responsible for: Concept Developing, Grasshopper Programming, 3d Printing

ABOUT

This project demonstrates the use of robotic technology in architectural applications. We experimented with a custom-built tool to simulate the 3D printing of sand, aiming to explore the potential of constructing buildings in the future using only robotic arms and local materials like sand or clay, without relying on concrete or other traditional building materials. The project seeks to investigate new, sustainable approaches to building by leveraging advanced robotics and locally sourced, natural materials in architecture.

Concept Of The Project

How to build with subtractive and additive technique in order to build sand structures?

Design process

Step 1: Designing the tools

Step 2: 3D printing the tools and acquiring the material. We started from the idea to carve in clay, but more ideas came when we tested with a sand bed.

Step 3: Testing with a "grabber tool" to scoop the sand and deposit it along the designed path

Step 4: Perfectioning the tool for ideal water and sand flow

Softwares Used

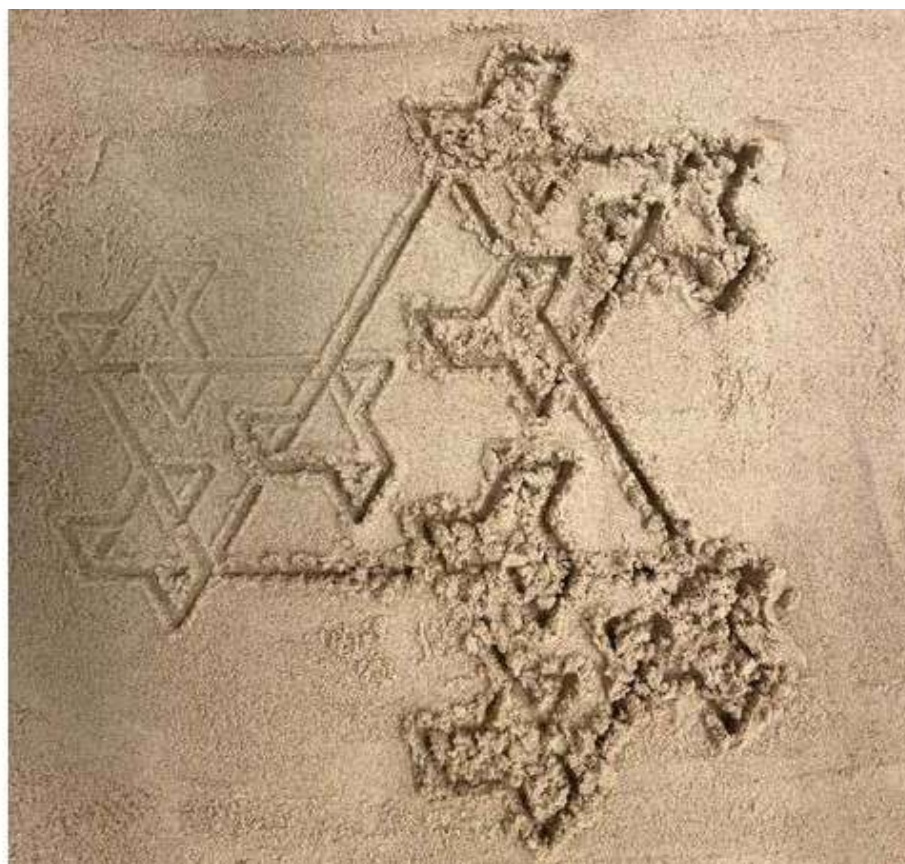
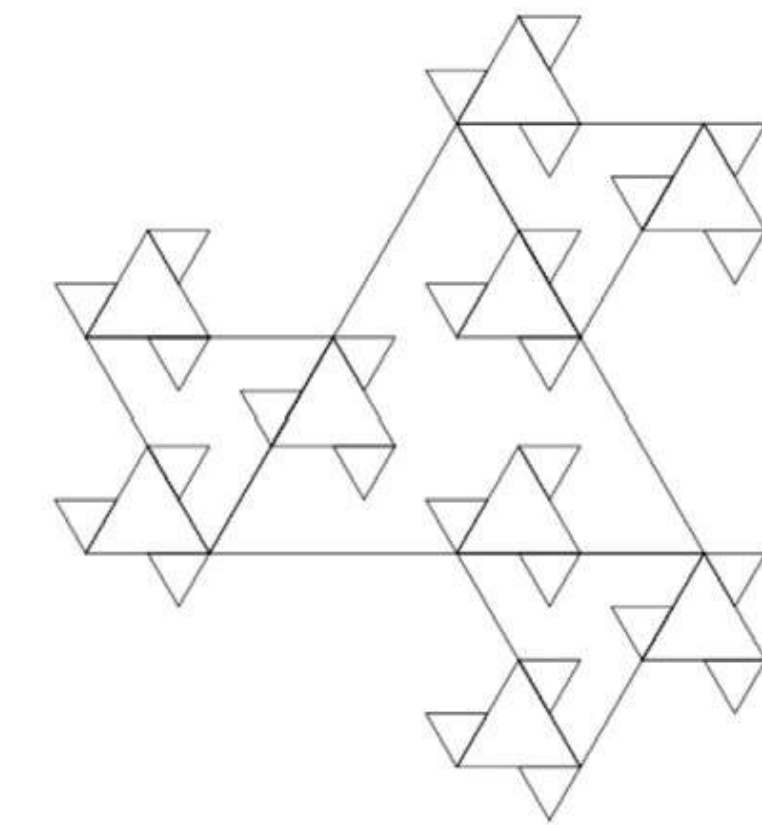
Designing the tools: Rhino Coding and path planning: Grasshopper

Hardware Used

3D printing the tools: Prusa 3D printers

ABB Robot Arm

The Experiemntal Path



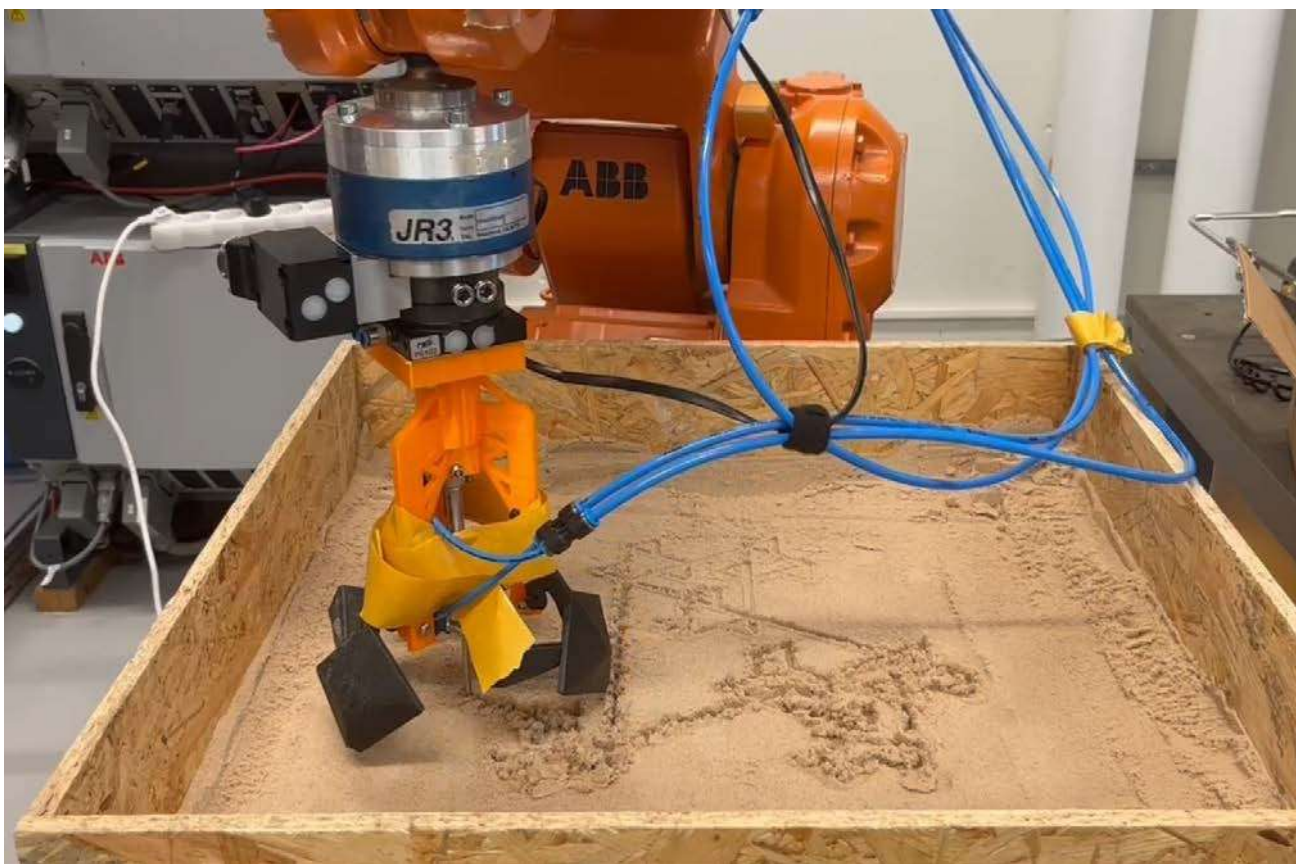
Concept Idea



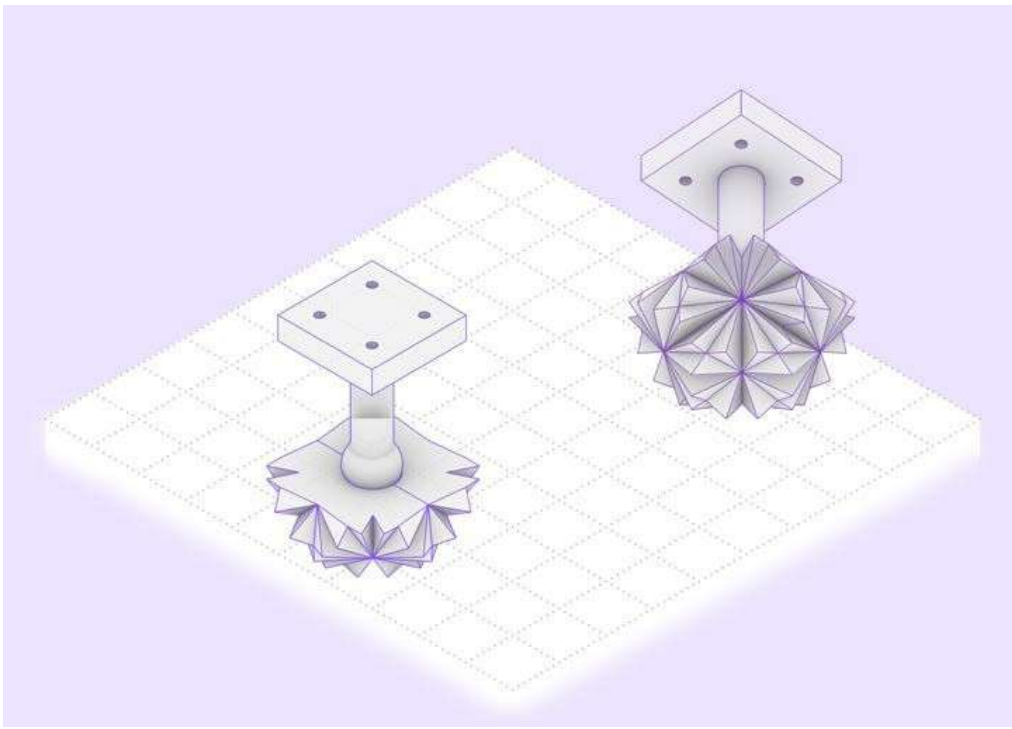
Work Result



Path Simulation In Reality

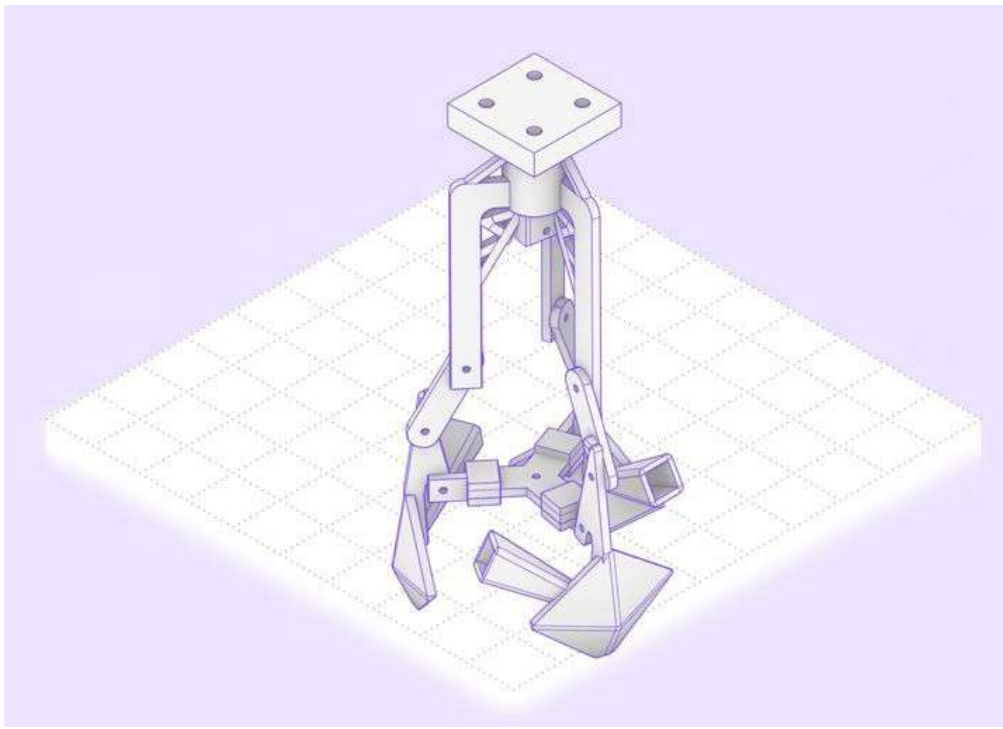


Tool 1: Complex subtractive path



Tool developed to create landscapes with different types of heights

Tool 2: Creative subtractive and additive manufacturing path

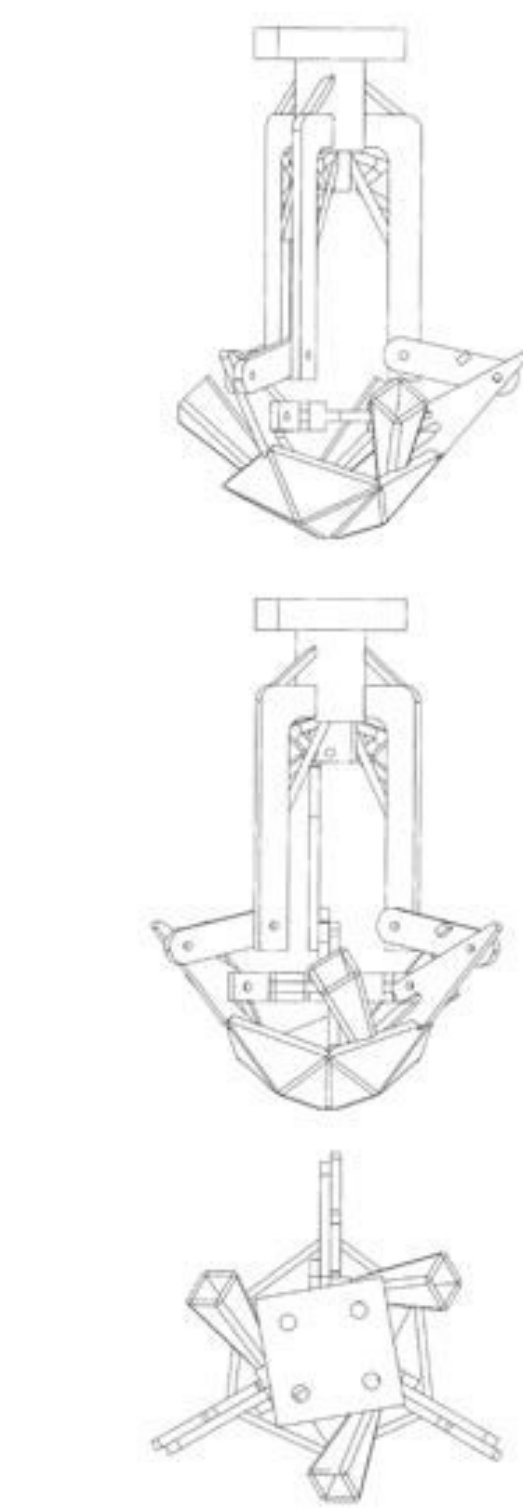


Tool designed to pierce the surface of the sand, scoop and create patterns that will solidify with the addition of water
Open position



Closed position (moment when the water is added):

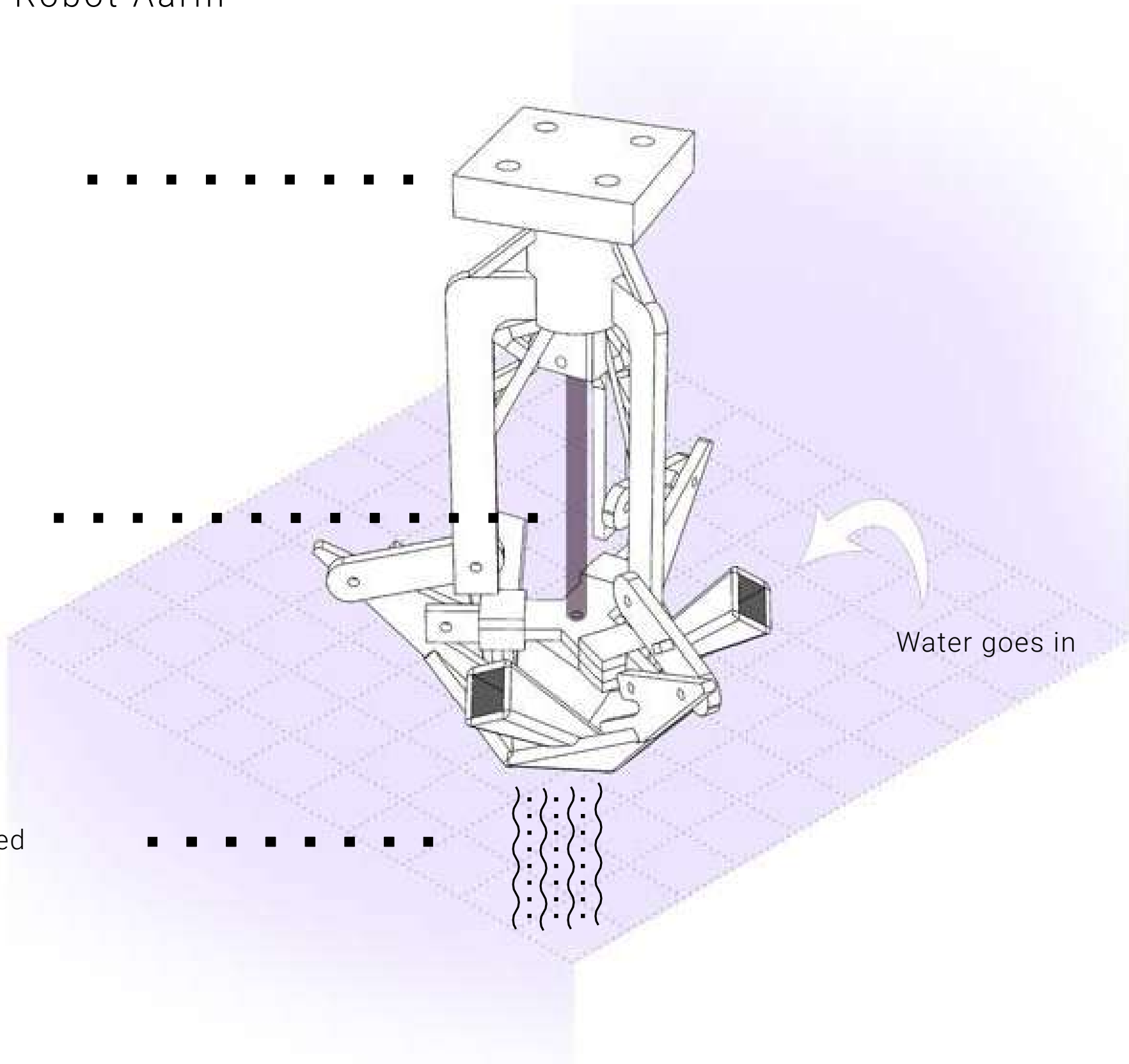
Components Of The Tool And Connection To The Robot Aarm



Connection to robot arm

Metal tube with a small air pump to open and close the grabber

Water and sand get deposited to create formations



The Final Path Simulation In Reality

