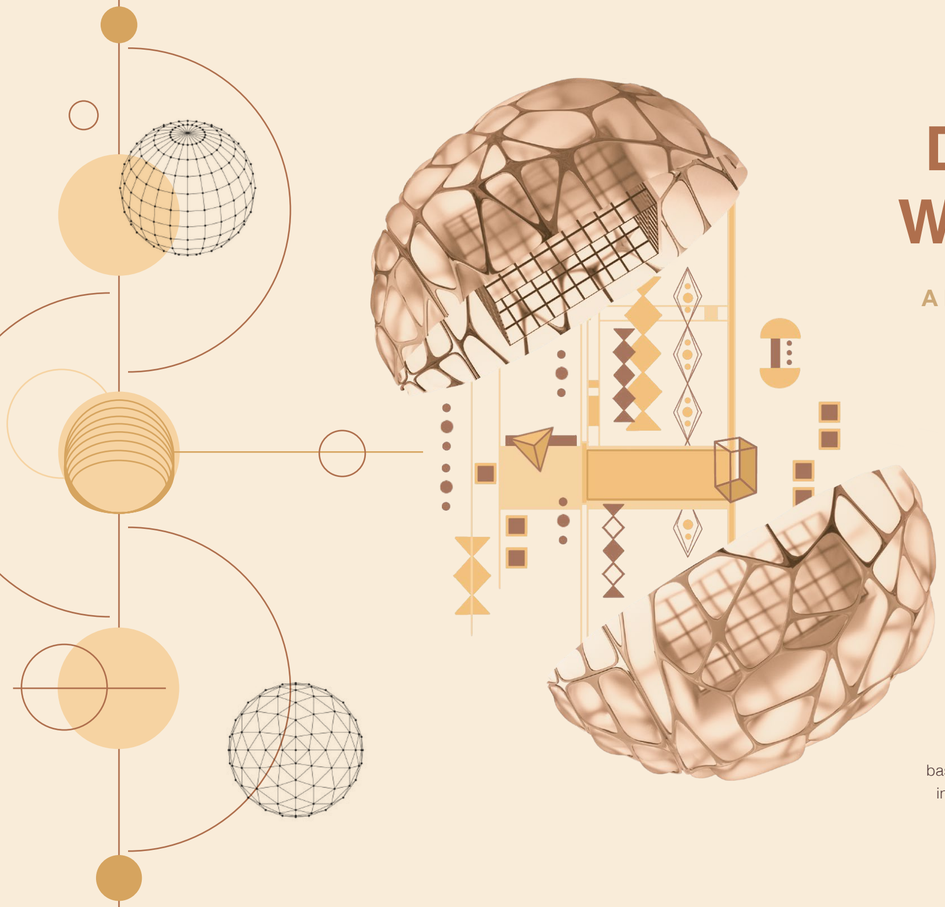


DEAD SEA WASTE BIN

A BIONIC ROBOT BASED ON DEAD SEA HALOPHILES

INDIVIDUAL WORK
2022/06 - 2022/08

This is a bionic robot for municipal waste based on the principle that Dead Sea salt-loving bacteria survive encased in salt crystals.

Background

The current method of garbage disposal will cause secondary pollution.

1

Air pollution

The entry of certain substances into the atmosphere, endangering human health or the environment.

2

Soil pollution

Pollutants from human activities enter the soil, causing soil quality to deteriorate.

3

Water pollution

Pollution caused by exceeding the self-purification capacity of the water body.

Research

It is perishable, breeding mosquitoes and flies; Spread diseases and worsen living environment.

Kitchen Waste

It is perishable, breeding mosquitoes and flies; Spread diseases and worsen living environment.

Recyclable Waste

It is difficult to decompose, damage the soil, reduce plant growth.

Other Waste

Occupy the surface and pollute the atmosphere, water and soil.

Hazardous waste

Occupy the surface, pollute the environment and spread diseases.

Garbage Disposal

Bury

Cons

· Poor capacity reduction effect
· Easy to cause water pollution
· Difficulty in biogas treatment

Recycle

Cons

· Low production input
· Improve energy recycling efficiency

Compost

Cons

· Poor capacity reduction effect
· Small scope of application
· Poor sales of products

Burning

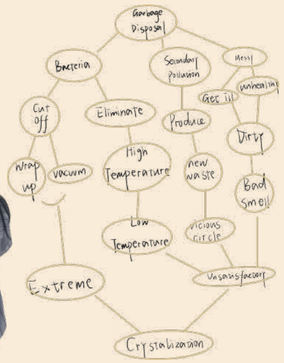
Cons

· High temperature requirements
· Large capital investment

Garbage Classification

The pollutants produced by human activities enter the soil and accumulate to a certain extent, causing the deterioration of soil quality and causing harm.

Brain Storm



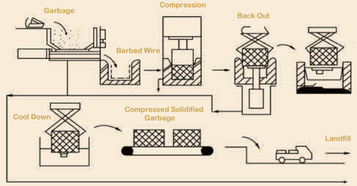
Summary

Getting away from garbage disposal reminds me of secondary pollution and more mess. It also made me think of various ways of isolation, and finally came up with the key word "crystallization".

Process Introduction

High Pressure Compression Waste Treatment Technology

Garbage is compressed into garbage blocks 3 times, wrapped into bales with barbed wire, and coated with asphalt to prevent fragmentation and leakage. Junk blocks are twice as dense as normal compression methods. During the high-pressure compression process, the corrosiveness is greatly reduced and the pollution to the environment is reduced. A cross-section of the litter bundle reveals a solid structure. At present it has become an inert material and can be used as foundation and reclamation material.



Process Digram

Reference: http://www.cmrn.com.cn/scyj21/201802/2828255.html

Summary

The case of the Halophiles being wrapped in extreme conditions in order to preserve the conditions needed for survival, I was reminded that the same principle of high pressure compressed waste treatment is used to wrap the waste in bitumen so that the bacteria and harmful substances in the waste are isolated from the outside environment and no contamination is produced.

Crystalline Salt--Salt--Archaea--Devour Research

Wrap Up

Salt crystallization

Sigalit Landau

She sank various everyday objects into the Dead Sea, and over time, the salt calcified to form a thick layer of crystals, turning the objects into sculptures.

salt

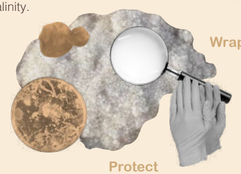
microorganism

There are no living things in the Dead Sea, only microorganisms can survive in such an extreme environment of high salinity.

Archaea

Bacteria

The microorganisms found in the Dead Sea are bacteria and archaea.



Wrap Up

830 million
-year old halophilic in salt crystals

Protect

Halophiles

After salt evaporation and crystallization, Halophiles and water are wrapped, making halophilic bacteria dormant and survive in the crystallization.

Devour

Salt crystals envelop halophilic and isolate the external environment from the inside of crystals, which is a process of devour.

Vacuum Environment

Asphalt Research

Through the investigation of asphalt materials, we can get several characteristics of asphalt materials.

Harmlessness
No harm to the environment

Closure
Effectively insulates the interior and exterior

Stability
Stable structure, not easy to break and deform

Scheme Summary

Through the investigation of asphalt materials, we can get several characteristics of asphalt materials.

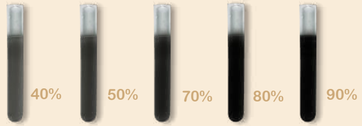
Landfill

1 Barbed Wire Wrap

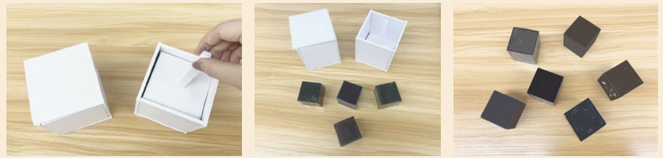
2 Garbage Compression

3 Asphalt Wrap

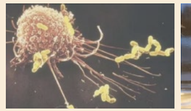
Asphalt Material Experiments



In order to find out in what condition the asphalt could be wrapped around the waste more quickly, I made up 5 different concentrations of asphalt.



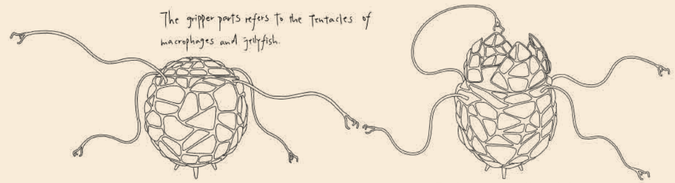
Sketch



Macrophiles

Jellyfish

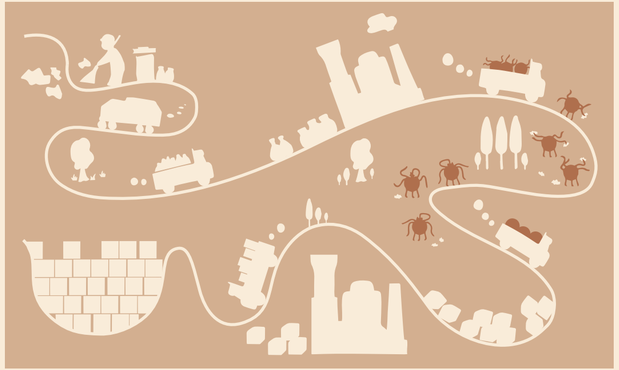
The exterior shape is extended based on the inspiration of barbed wire wrapping garbage.



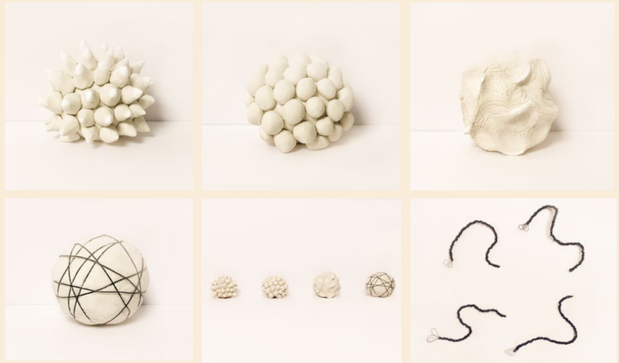
Working status

Garbage collection status

Storyboard



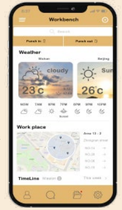
Prototype



Interface

Desh recycle

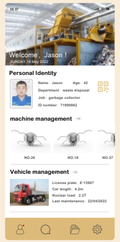
This is a work app for a garbage collection company.



Color matching

Icons

It can connect workers, robots and trucks, realize integrated management, and record data systematically. Workers can clearly understand work tasks and handle all work matters on the app.



INITIAL INTERFACE

START

Workers start work via mobile app

Each worker is able to assign robots and trucks and is tied in via a mobile app to manipulate the robot and view specific job data in real time, location.

CLICK TO BIND

CLICK TO MANIPULATE

CLICK TO VIEW DATA

USAGE DETAILS

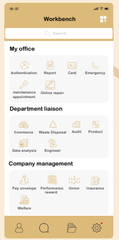
The app tracks job data and automatically records it through the connected robot, generating reports.

I'M WORKING!!

I'M ALSO WORKING!!

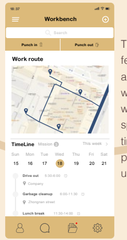
I'VE FINISHED MY WORK!!

DATA RECORDING



WORKBENCH

Work scheduling, payroll, job matching, maintenance reporting and many other functions in one place, making it easy for users to manage their work in a scientific and efficient way.

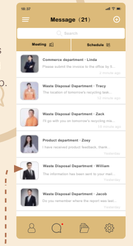


AUXILIARY WORK

The app brings together features such as maps and calendars to help workers achieve quick work scheduling, and specific work content and times are arranged and planned in a clear and unambiguous manner.

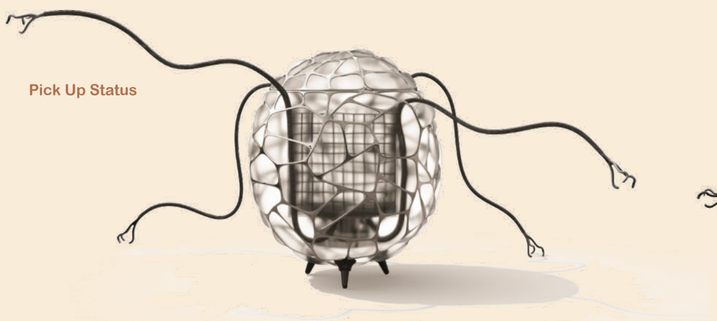
CORPORATE COMMUNICATION

All staff in all departments of the company can hand over their work via the app.



3D Model

This is a dead sea halophilic bacteria bionic robot, designed based on the principle of salt crystals enveloping halophilic bacteria.



Pick Up Status

The robot automatically picks up the garbage, wraps it with barbed wire, and transports it back to the garbage treatment plant for high-pressure compression to realize the rapid treatment of urban garbage.

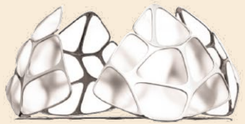
Collection Status

When the robot is in the working state, after the paws are stretched out to pick up the garbage, the top cover is opened and the garbage is thrown into the barbed wire inside the machine for collection.

And open the top cover to facilitate the return of garbage.

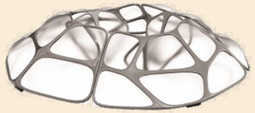
ShippingStatus

Once collected, the robot retracts its arms inside its body and transports them by truck back to the processing plant.



Fully Open

The fully opened lid is convenient for the machine to return garbage.



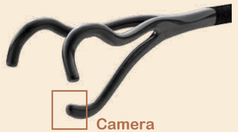
Half Open

The half-open state of the lid is to put the garbage into the machine after the robot arm picks up the garbage.

Product Details

Mechanical Gripper

The mechanical gripper can be tightened and relaxed freely to achieve the function of picking up garbage.



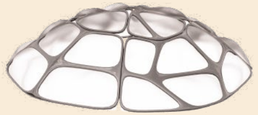
Camera

Identify Device

A camera is installed at the front end of the mechanical gripper to scan the surrounding environment, identify garbage, and achieve the purpose of picking up garbage accurately.

Braided Shell Robotic Arm

The robot arm adopts the pattern of weaving and wrapping the internal structure, so that the robot arm can swing flexibly and stretch freely.



Robot Cover

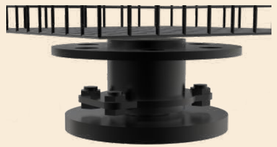
The robot cover is divided into four petals, which are linked by metal hinges for easy opening and closing.

Internal Structure And Barbed Wire

Inside the robot is a square space where barbed wire can be placed. When the garbage is collected, the robot will return to the processing plant and automatically push out the garbage wrapped in the wire.

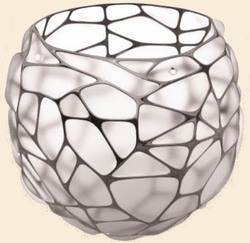
Arm Retracted State

When all the trash is picked up, the robot retracts its arms inside the machine to save space, and boards a truck to wait for workers to transport it back to the processing plant.



Bottom Mechanical Structure

The internal structure of the machine is supported by the disc at the bottom, and the garbage is returned by lifting. The arm is linked to the disc, and the disc controls the extension length of the arm through rotation.



Machine Shell

The shell is made with the concept of wrapping. The transparent shell allows passers-by to clearly see the garbage collection process, which helps passers-by understand that the environment is not easy to clean.

Effect Display

Outdoor Working Effect Display

Pick-Up Status
Effect Display

Collection Status
Effect Display

While the robot is picking up rubbish, passers-by can clearly see the inside of the machine through the transparent housing, enhancing their understanding of urban waste disposal.

The robot in its outdoor working state moves on its own using its mechanical legs, identifies the road surface via a camera and picks up litter.

Collection Complete And Delivery Back To The Factory Effect Display

The robots enable rapid disposal of municipal waste, combined with app control to reduce the burden on workers and make city cleaning fast and efficient.

Internal Form

Dormant State

The robots that leave the treatment plant and the robots that finish recycling walk themselves to the pick-up truck and retract their arms into the body by means of a rotating mechanism to save cargo space.