

BIOBOX

ALICE AZZARELLI
CARL INAC
EDITH LAI
JIYOO JEONG
MESUT YANG

Using the pomelo fruit to revolutionise delivery services.

1

THE INSPIRATION

Pomelo fruits have a mass of 1 to 2 kgs, but are able to withstand impact forces resulting from falls of over 10 meters. The fruit's impact resistance is mainly due to the hierarchical structuring of the peel, which is made up of layers of different densities.

The pomelo peel's structure has two main layers working together to protect the fleshy fruit inside. The outer layer, the flavedo, has tightly packed cells. The thicker inner layer, the albedo, has a more open structure and lower cell density. Vascular bundles running through the albedo layer maintain its shape and structure.

2

THE PROBLEM

The packaging industry uses the most plastic in the world. Delivery services rely on unsustainable options, such as styrofoam peanuts and bubblewrap, to prevent the damage of shipped goods.

We set out to create a box that was:

- DAMAGE RESISTANT
- SUSTAINABLE
- LOW COST



3

THE SOLUTION

The layer structure of our BioBox is the product of a bio-inspired approach, combining cardboard types of different densities that reflect these naturally occurring structures and mimic the strength of the pomelo peel.

To make use of its ability to absorb impact energy, the pomelo's low-density foam was transferred to a cardboard equivalent. Combining layers of different densities exhibits a novel behavior under load, protecting the contents of the box.

4

THE NEXT STEP

We hope to replicate the cardboard layer structure to support the shape of specific items, such as technology hardware, for further personalised protection.

