SUPERMARKET OF THE FUTURE / **D-BASF** JIN JING / UdK 2022 / PROF. INEKE HANS / ASSISTANT MACIEJ CHAMARA



PUB0

a reusable meal-kit delivery packaging

THE OBJECT





The initial inspiration for this project was inflatable air cushions that are most commonly seen around the shipping logistic scenario. The most iconic and recognizable of these air cushions would be the bubble wraps.



During my research, I found that the structure of bubble wraps are often used in insulation, because the air in the structure can slow down the transfer of heat.

Typically insulation foils are plastics backed with aluminum foil to prevent heat radiation.

This layering of material make these insulation foils impossible to recycle.

Because most of the recycling infrastructure today are not catered to plastic foils, even though air cushioning are usually mono-material, they are still hard to recycle.





What would happen if we just use the air cushioning as insulation?



Is it possible to make single-use air cushioning more durable and eventually reusable?



Where could both the insulation and cushioning property of air cushions be utilized?



During the covid-19 pandemic, as people are staying at home more than ever, there has been a surge of need for grocery delivery service.

Meal-kit services take the convenience one step further, allowing consumers to skip the food prep process: planning recipes and ingredients, shopping at the store, sometimes even cleaning and chopping.

Most meal kit services are based on a weekly subscription model, which means large quantities of food need to be delivered fresh and chilled.

Therefore, the meal kit boxes usually consist of three parts: a cardboard box, a layer of plastic insulation and ice packs.

However, even though the business claim these packaging to be recyclable, they are still just meant for single use. Given how frequent the packages come, tremendous amount of waste could be accumulated.



For this project, we are sponsored by BASF with three types of high performance plastic to explore their potential in sustainable design.

I've chosen Elastollan N[®] biobased plastic for its high abrasion and tear resistance. This specific kind of plastic has been used to make bicycle tire. Aside from that, this material also has great low temperature flexibility. There-

fore it is suiting to use this material to make reusable air cushioning/insulation.



THE MATERIAL

Material Properties – *Elastollan® N* - Series

Elastollan®		C90A10	N65A12 P	N75A12 P	N85A12	N95A12
Bio - Content*	[w/w-%]		48	49	48	43
Hardness	[Shore]	90A	65A	75A	85A	95A
Tensile strength	[Mpa]	48	30	30	40	45
Elongation at break	[%]	620	600	510	420	430
Tear strength	[N/mm]	115	30	40	70	130
Abrasion loss	[mm^3]	38	35	25	35	35
Density	[g/cm^3]	1,200	1,15	1,17	1,19	1,21
YI	[]	5	10	13	17	18
* Bio content as w/w-% ca						



DEATION

In the begining of this project, my focus was only on the air cushioning/insulation in these meal-kit boxes. The original design would still come with a cardboard box.

After the air cushion is deflated, it could be folded into a flat piece and then be easily stored in a back pocket. In this way the product can be well-protected against all elements when it is waiting in the consumer's home to be sent back.















After a few material experiments, I found that when the air cushions made of thicker plastic are fully inflated, they could be very structural. Therefore I decided to make the entire box out of the inflated structure.





ailing into for delivery printed on study paper

2

In order to make the box flat-packable, I took inspiration from the folding pattern on the bottom of paper bags.







Polyether based TPU foil with ultrasonic welder





PVC foil with ultrasonic welder

TPE foil with ultrasonic welder



translucent PVC foil with ultrasonic welder

FINAL DESIGN





This piece would be heat sealed with a stamp mold, then the edges would be joined by ultrasonic welding.



















After the boxes are delivered, they can be deflated, folded and then stored in a binder-sized envelope along with the reusable ice packs. The bags could either be picked up at the next delivery or dropped off at the post office. After collection, the bags are sanitized, inflated and ready to be dispensed again.