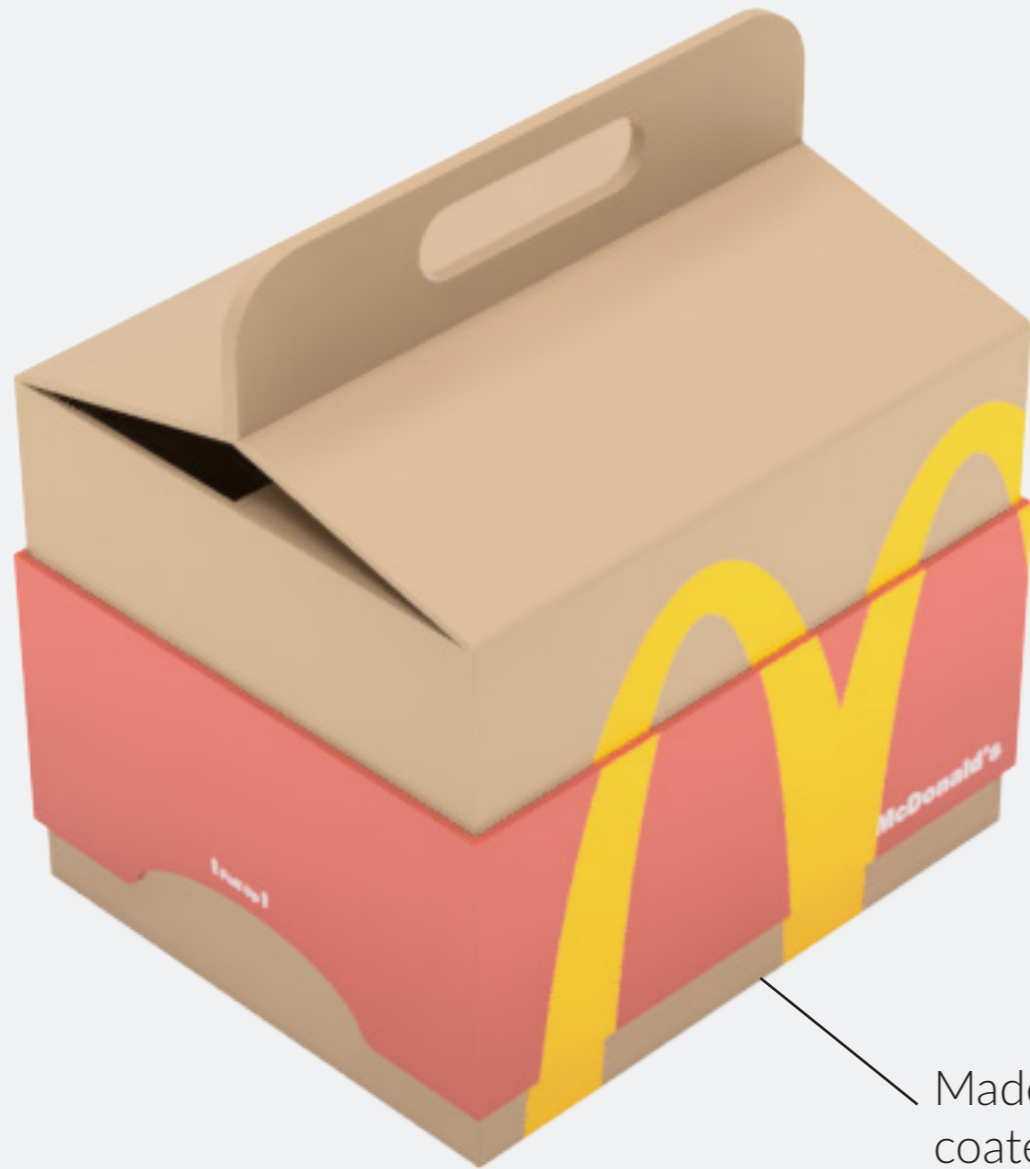


TAKEAWAY CARRIER

A solution to encourage behaviour change to reduce use of plastic sachets.



Product Overview



Made from aqueous coated SUS paperboard

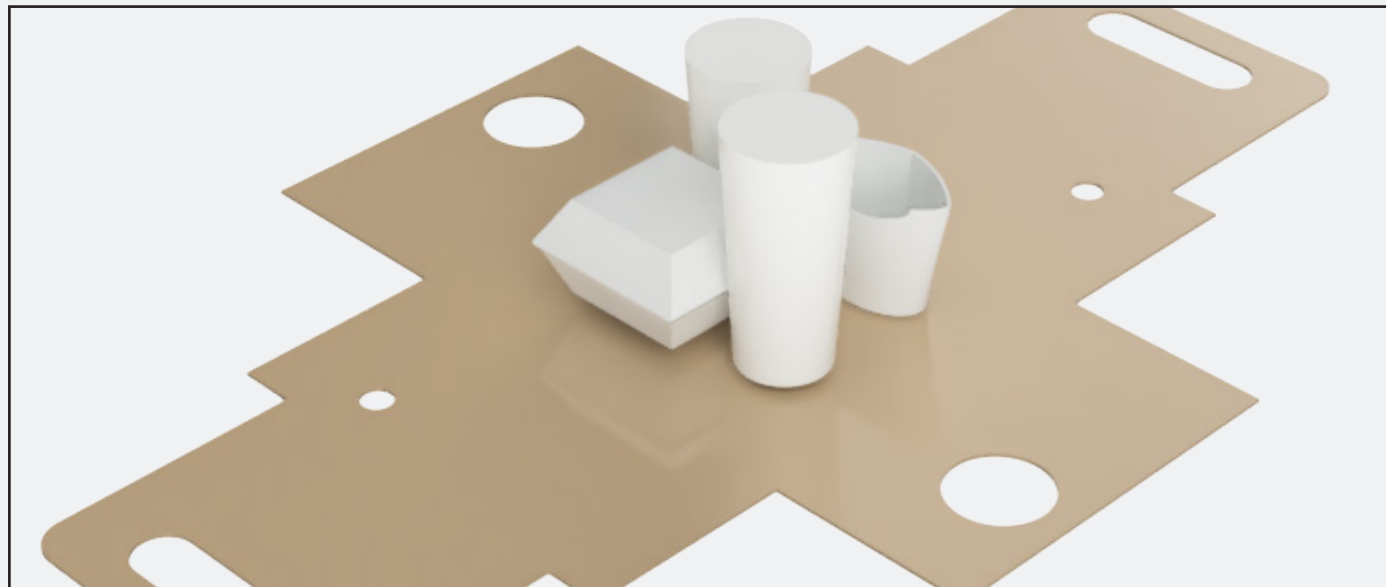
- Easy to carry
- Flat packed
- Food safe
- Recyclable

Box Opened Up



Product Overview

Different Arrangements



Target Market



- Anyone who goes to fastfood restaurant for takeaway food
- Should be suitable for any gender, any age
- It should be suitable for the general public to use

The stakeholders include:

- Fastfood restaurant (McDonald's in this case)
- People that are working at the restaurant
- Customers receiving their food

User Research

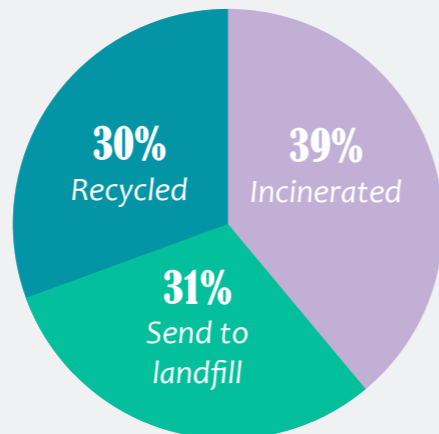
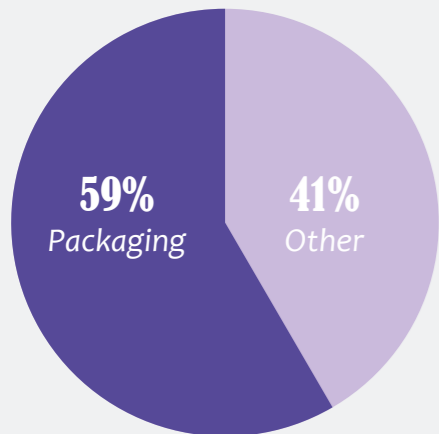
Problem Overview

855 billion pieces of plastic sachets end up in the ocean each year.



These plastic sachets erodes into micro-plastic in the ocean overtime, and return to our food chain through water and seafood consumption.

Plastic Waste Statistics



Do you feel postively or negatively about the use of plastic condiment sachets/containers?



User Testing



- Doesn't balance due to weight of cup in one side



- Can be flat-packed but is unstable



- Similar to current design but drink will be pushed up when placed down

User testing have been carried out using different iterations of the prototype until it reaches this final design.



User Journey

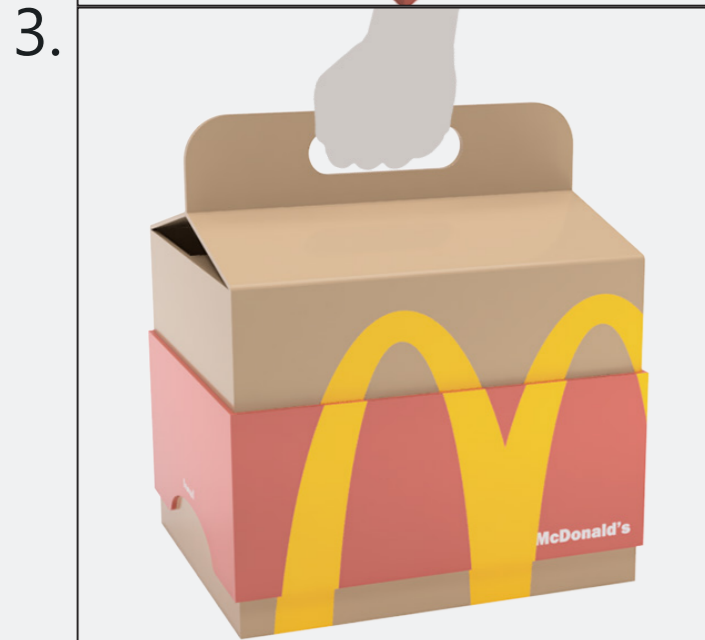
Employees' Perspective



Employee assemble the carrier box from flat cut out using the strap.

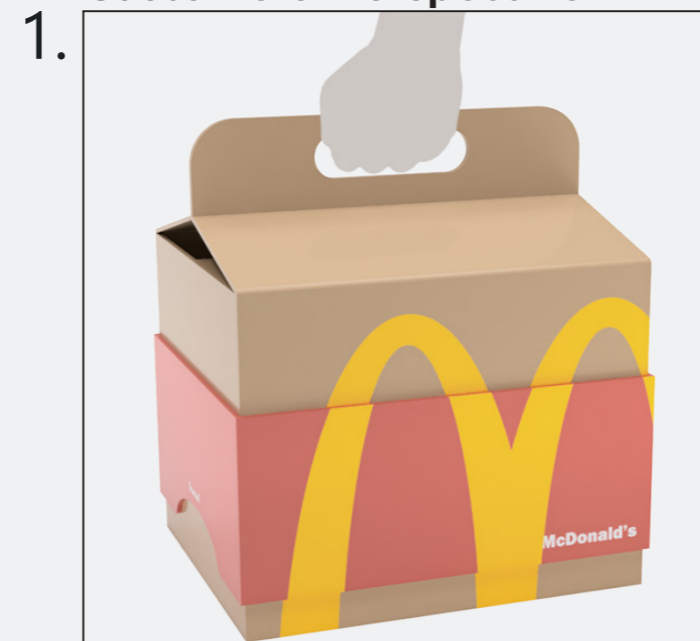


Food and drinks are packed inside the carrier.



Carrier can be closed and be carry away by customers.

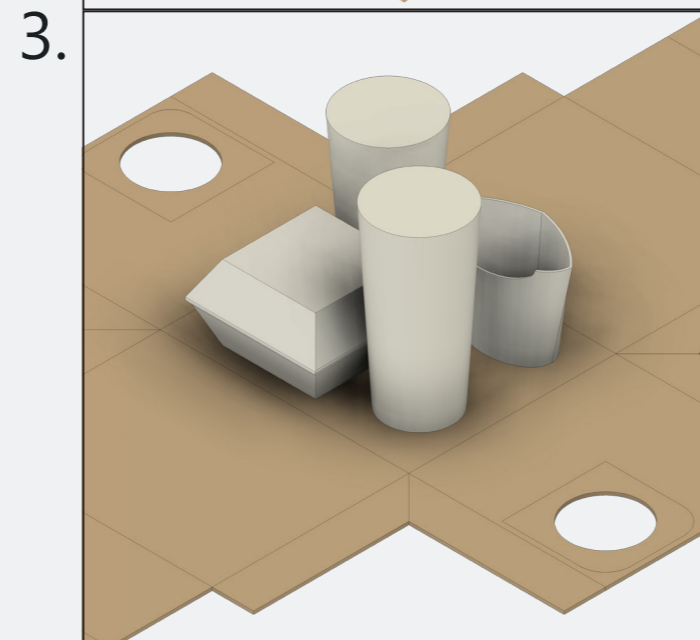
Customers' Perspective



Customers carry their takeaway to their desired destination.

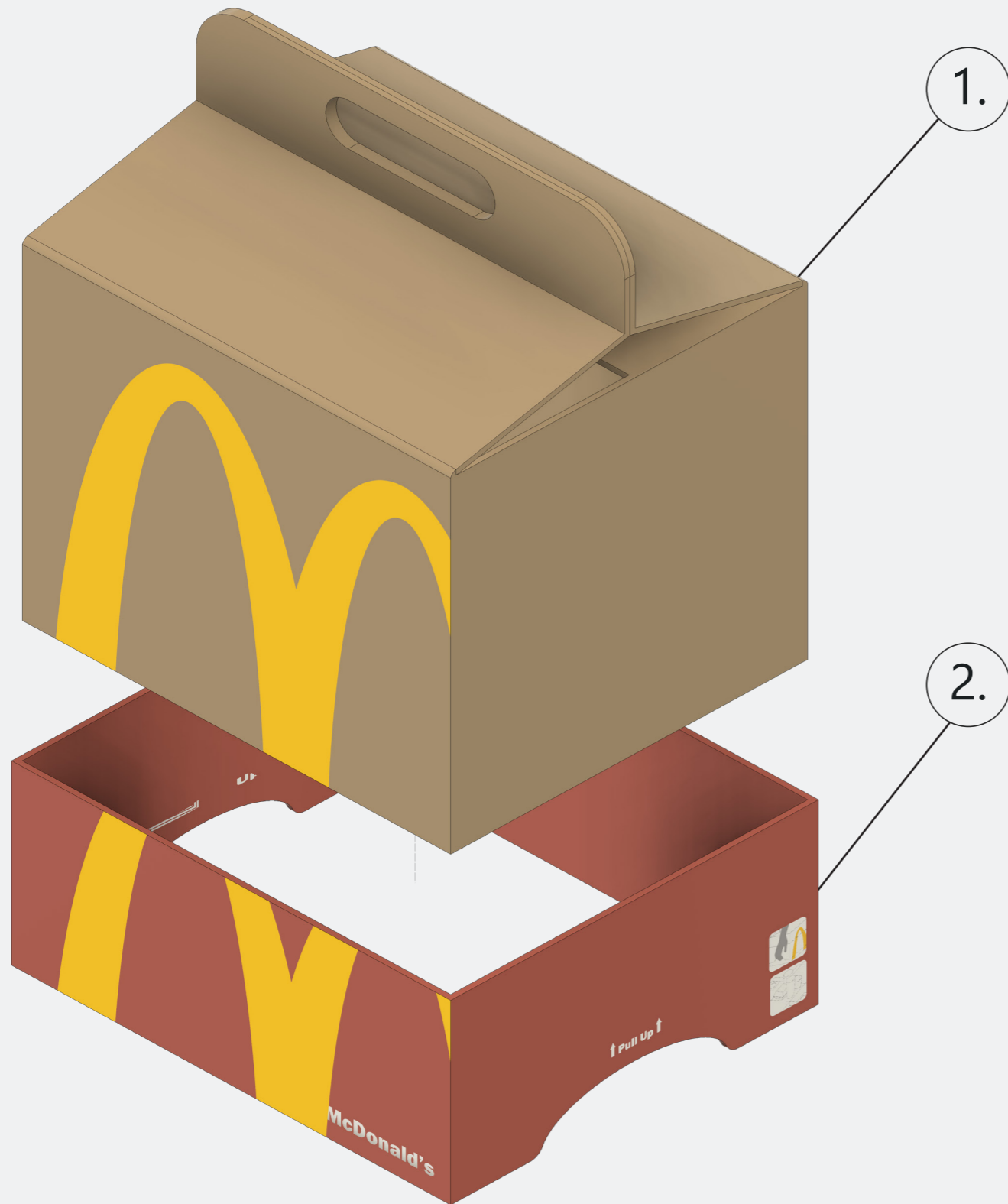


Open carrier from the top or pull up strap to open up packaging fully.



Once the strap is pulled up, the packaging is opened up fully, providing a surface to eat/drink.

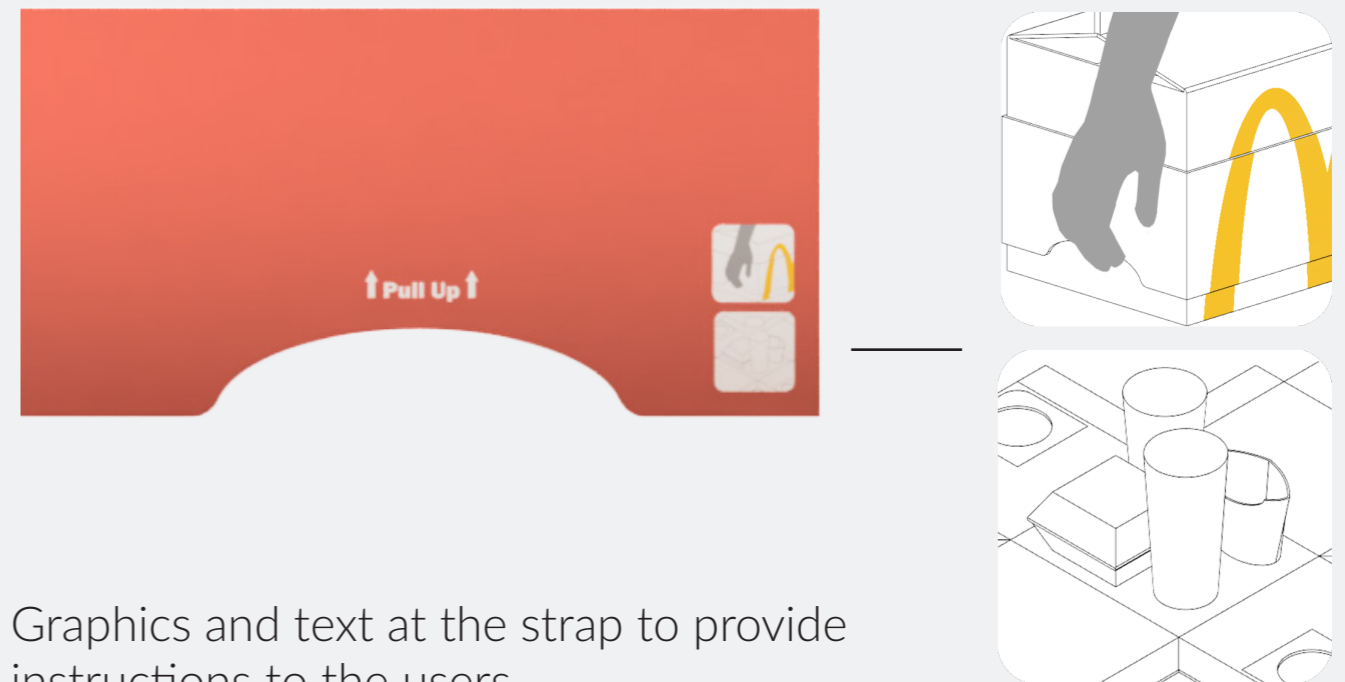
Components



Part List

| Component No. | Component Name | Material | Number of Component |
|---------------|----------------|--------------------|---------------------|
| 1 | Carrier Box | Aqueous coated SUS | 1 |
| 2 | Strap | SUS | 1 |

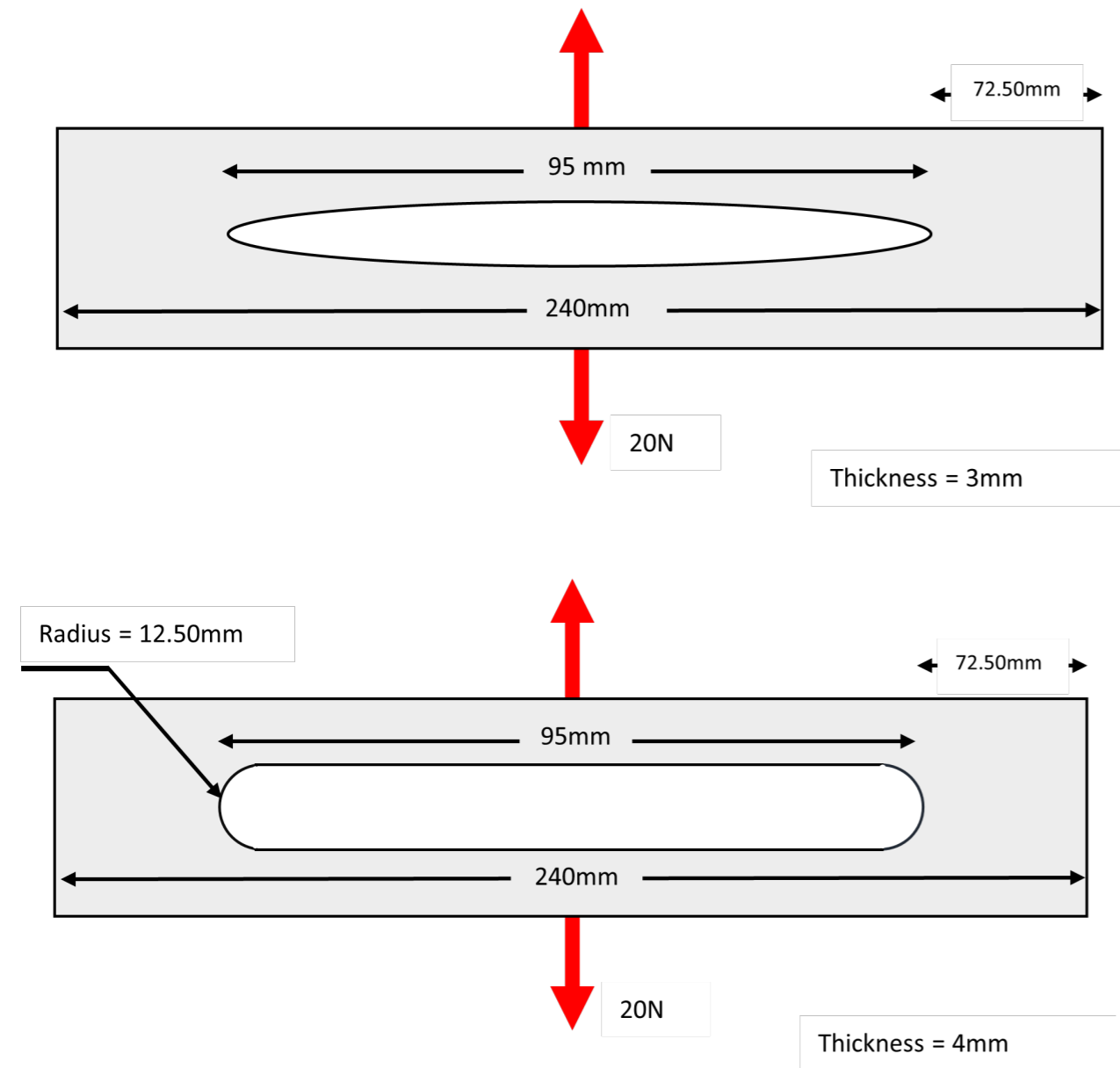
Strap



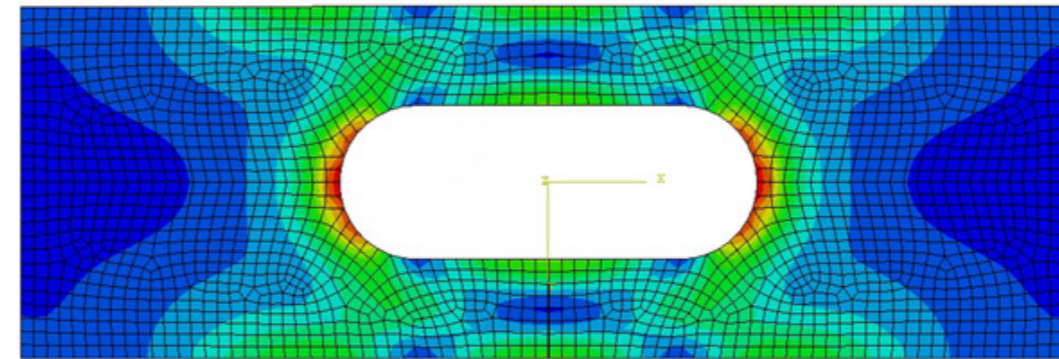
Graphics and text at the strap to provide instructions to the users.

Technical Research

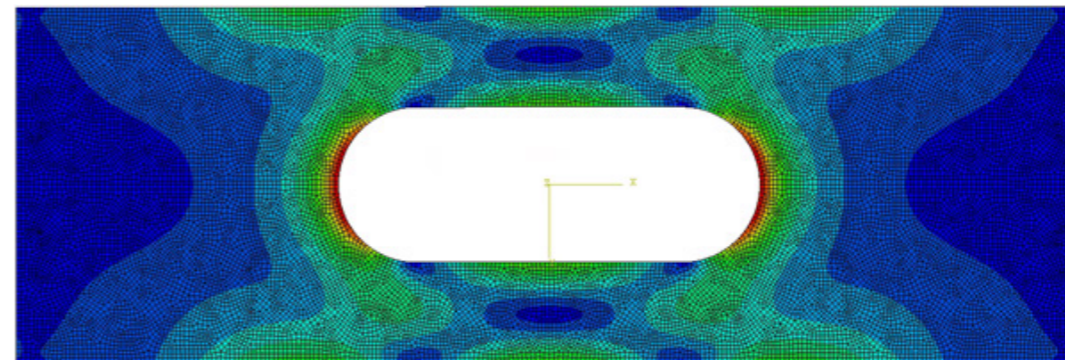
Stress Concentration Analysis



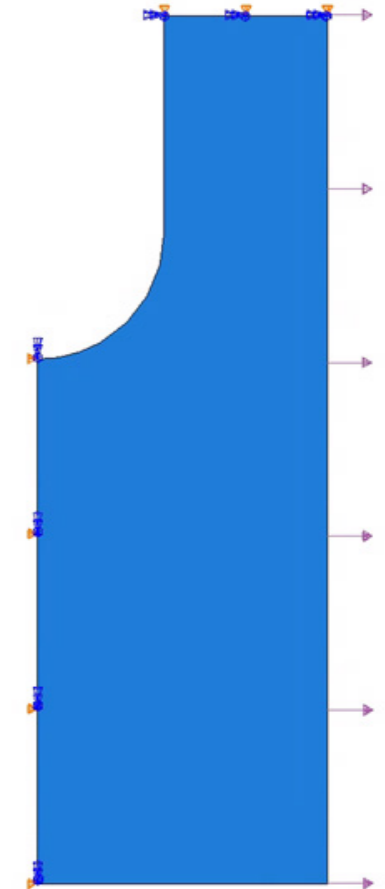
Finite Element Analysis



Global Seed Size = 3



Global Seed Size = 1

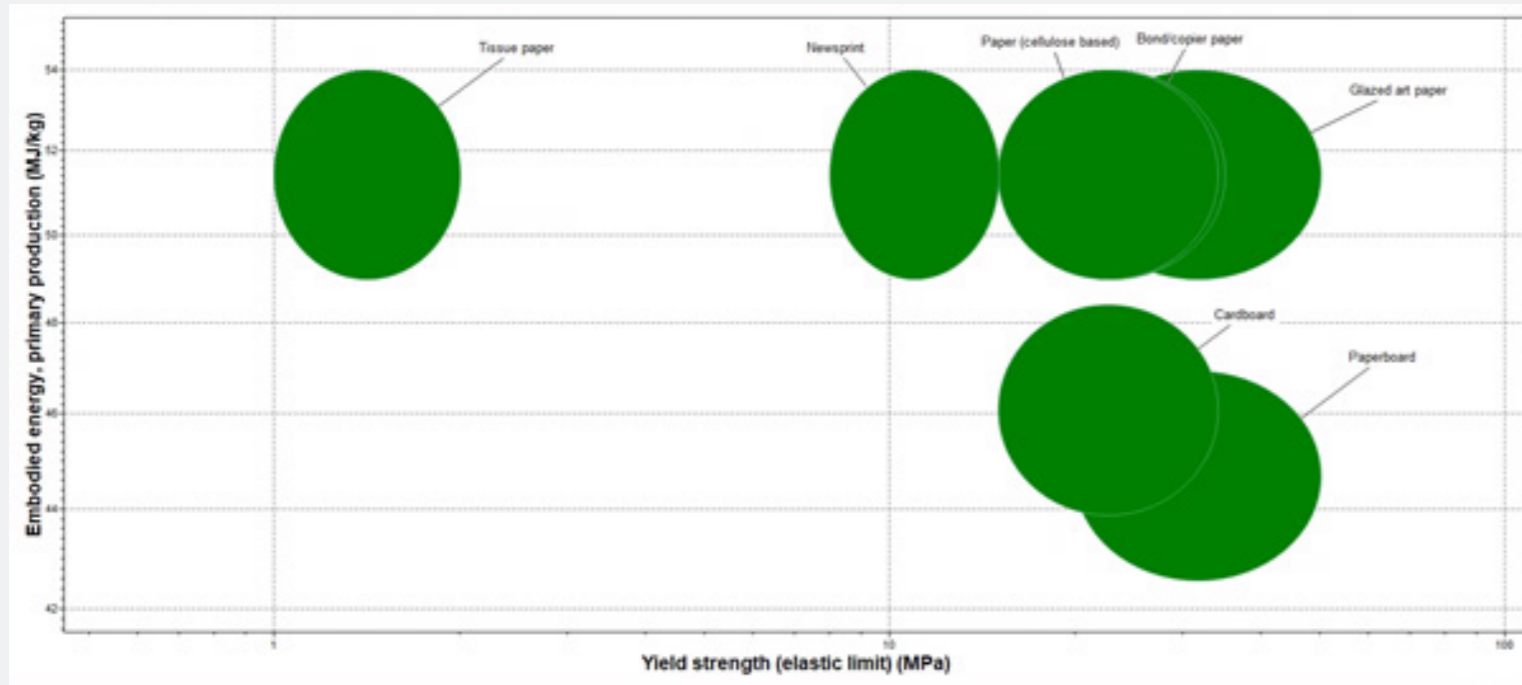


Stress concentration analysis have been carried out to calculate the maximum stress of a hole under load. This allows material to be selected to avoid the handle from failing when load is put inside the carrier.

Finite element analysis is also carried out using Abaqus. Boundary conditions and load were applied to the model as shown and a range of global seed sizes were tested until result has converged.

Technical Research

Material Selection



Edupack was used for the material selection process. The materials must be recyclable and biodegradable. It must also have a yield strength larger than the maximum stress calculated previously to prevent the material from failing under load. **SUS Paperboard** was selected due to its high yield strength and stiffness.

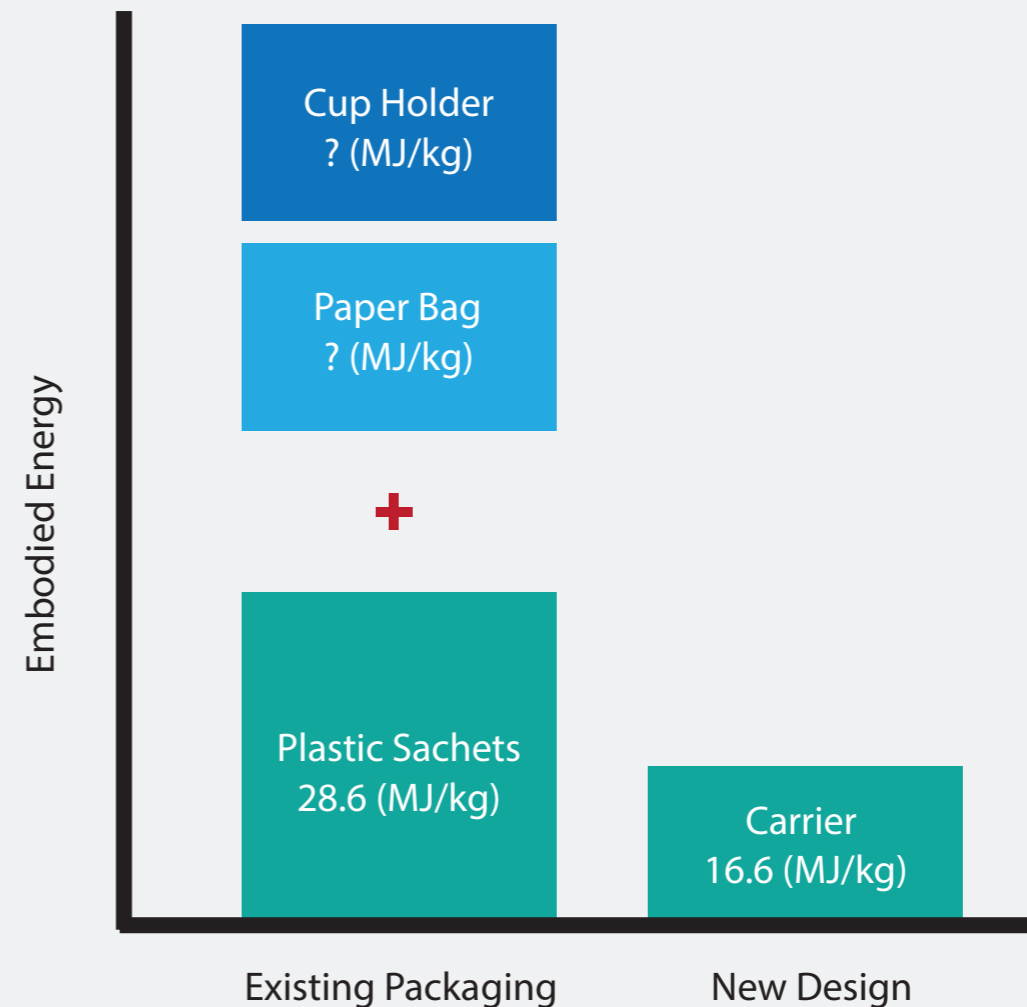
Material Coating

Research was carried out to investigate coatings on the packaging that allows it to be food safe. **Aqueous** coating was selected in the end as not only it is food safe, it can be recycled even after it has been contaminated unlike coatings such as PE and PLA.

Comparison with Existing Packaging

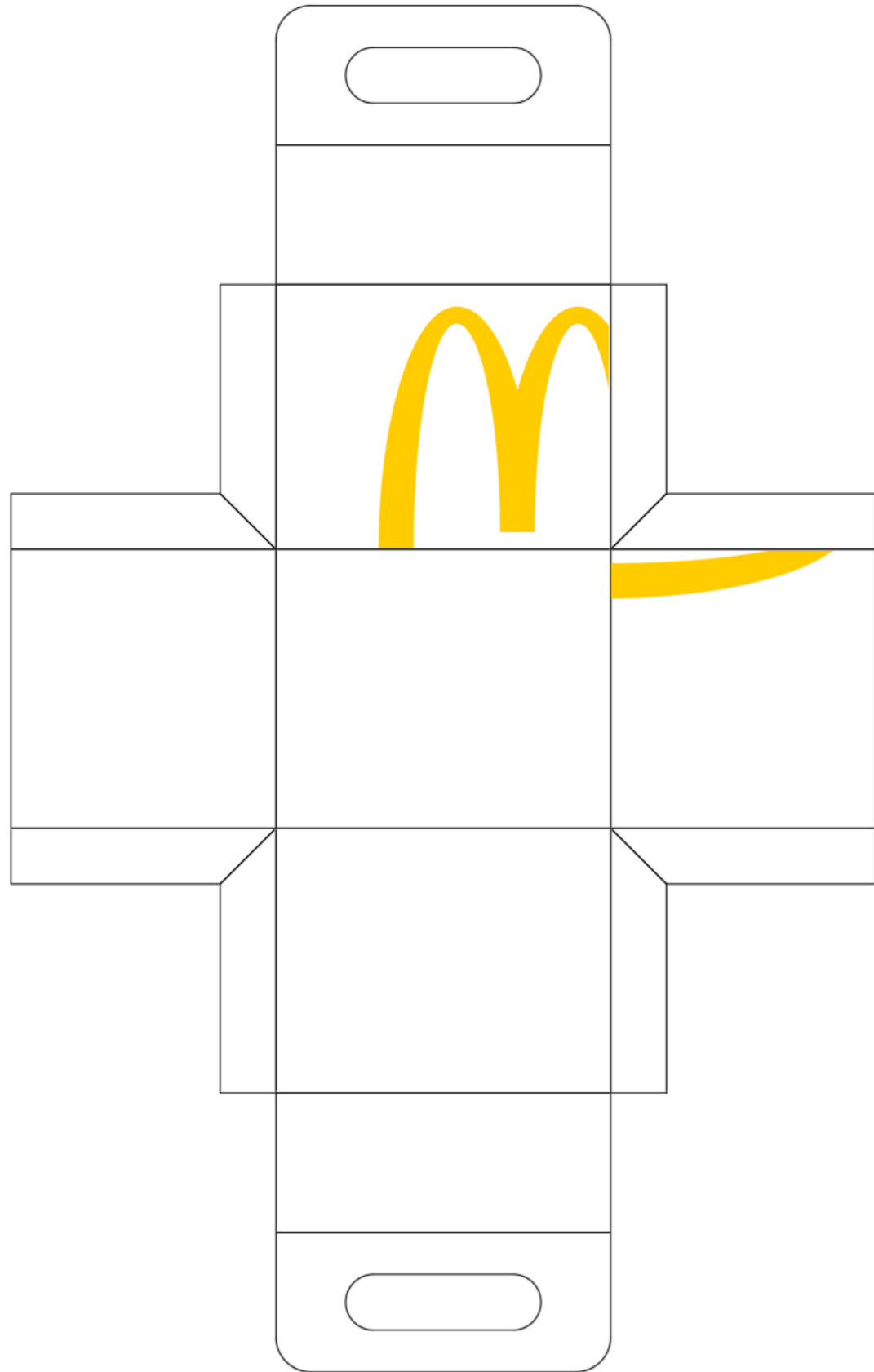


Embodied Energy used for Takeaway Packaging

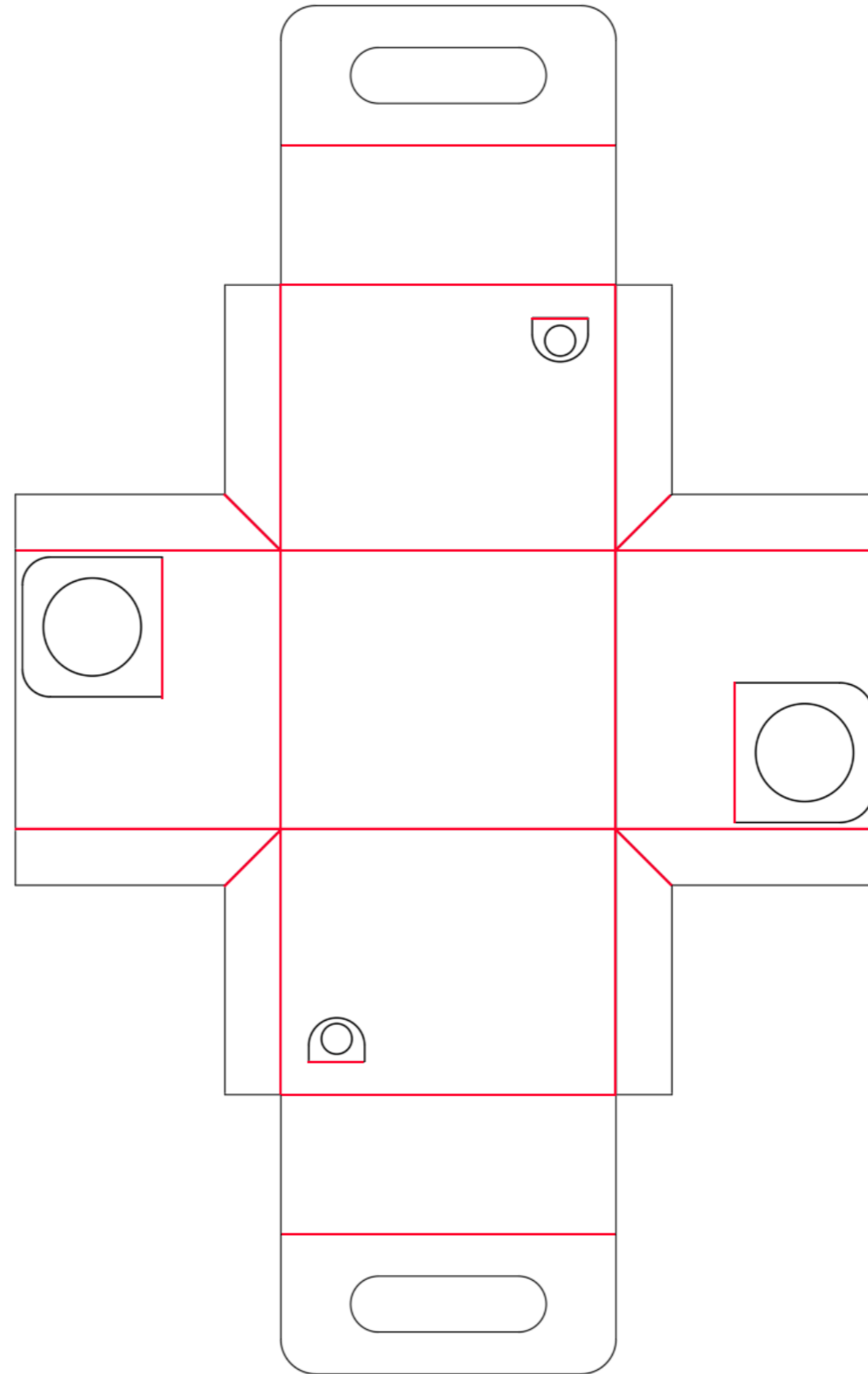


Manufacture Details

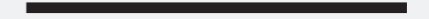
Packaging Printing



Dieline



Cut Line

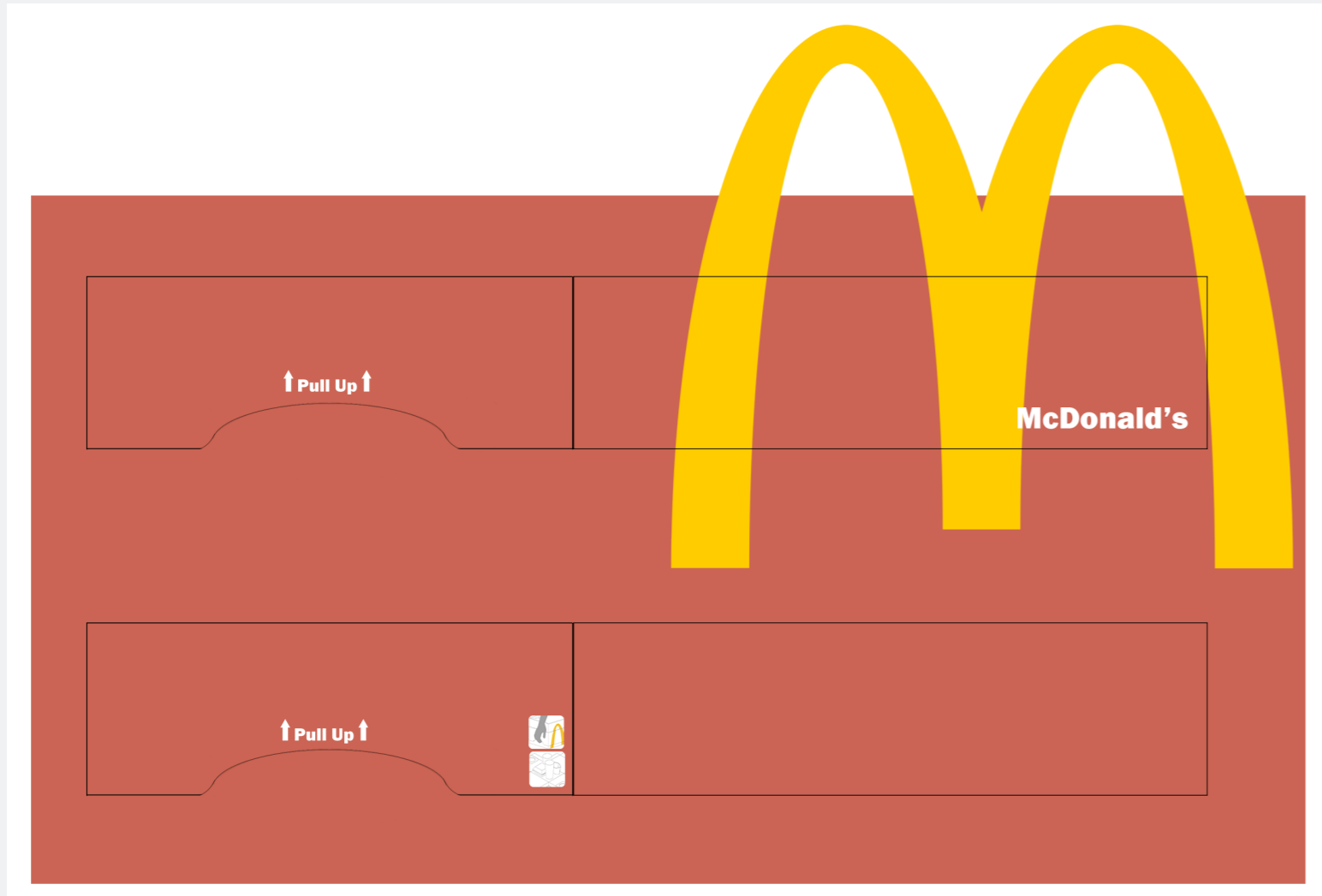


Fold Line



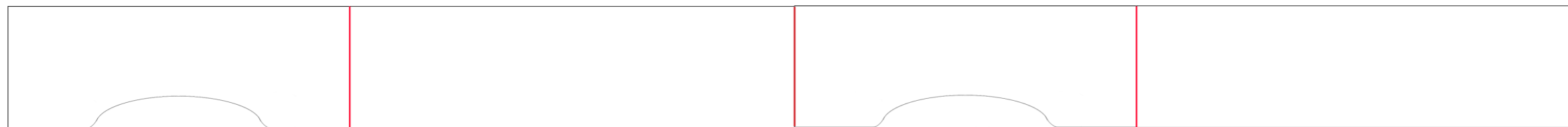
Manufacture Details

Packaging Printing



*Cutout is splited into 2 parts for presentation purpose

Dieline



Cut Line

Fold Line

Costing

| Manufacture Cost | Cost |
|------------------------------------|-----------------|
| One-Off Custom Die Cost (Dieboard) | £177.73 |
| Labour Cost | £0.22 per piece |
| Material Cost | £0.62 per piece |
| Total Cost | £0.84 per piece |