



RAYNE LONG BOARDS

Rayne Longboards
167 East 1st Street, Unit B
North Vancouver
BC Canada
V7L 1B2

MCAD COLLABORATIVE PRODUCT DESIGN

TEAM REPRESENTATIVES

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Date :
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Prepared for :
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Rayne Longboards
167 East 1st Street, Unit B
North Vancouver
BC Canada



www.raynelongboards.com



DESIGN BRIEF

Client
Rayne Long Board



PRODUCT

Rival Board

RAYNE BOARD COMPANY CONCERNS:

- Packaging Materials
- User Experience
- Protection of Board during shipment

ADDITIONAL MCAD TEAM CONCERNS

- Shipping Methods
- Material Selection
- Reduce Waste



DESIGN PRIORITIES

#1 Assembled Product Shipping- Rayne currently uses an unconventional methods of shipping and expressed to create a more efficient mean to ship their products while protecting the integrity of the board.

#2 Packaging Presentation: Rayne would like to experiment in diffrent means to draw consumers towards their products and develop a brand within their packaging.

#3: Reduce Waste: Rayne currently does not have any programs or initiatives that decreases their carbon footprint.

#4 Material Selection: MCAD team will explore different sustainable materials for an alternate board that keeps the integrity of the Rayne board but allows for the material to have an alternate end of life in comparison to its current board.

#5 Shipping Methods: Rayne recieves multiple amounts of materials from numerous sources across the world. The MCAD team will explore means in reducing the distance to recieve those materials will decreasing the company carbon footprint without altering the brand of Rayne products.

DESIGN METHODS



DESIGN METHODS



LIGHTWEIGHTING

The Rayne Envy Series includes both 62mm and 70mm, Slide Formula, freeride and trick oriented wheels. Intended to break free, slide smooth and predictably and hook up on cue, Envy wheels are meant to be destroyed, leaving behind a trail of sugary urethane goodness.



PERSUASIVE DESIGN

The Rayne Envy Series includes both 62mm and 70mm, Slide Formula, freeride and trick oriented wheels. Intended to break free, slide smooth and predictably and hook up on cue, Envy wheels are meant to be destroyed, leaving behind a trail of sugary urethane goodness.



MATERIAL SELECTION

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Along with utilizing the 6 design methods to create impactful design solutions the MCAD team will also take in consideration Rayne's future business opportunities that were discussed.

- 1| Increasing Market presence
- 2| Sensitivity to Rayne Current Board Design
- 3| Increase bond with Rayne current consumers
- 4| Rayne's Brand



ENERGY CONSUMPTION

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CRADLE TO CRADLE

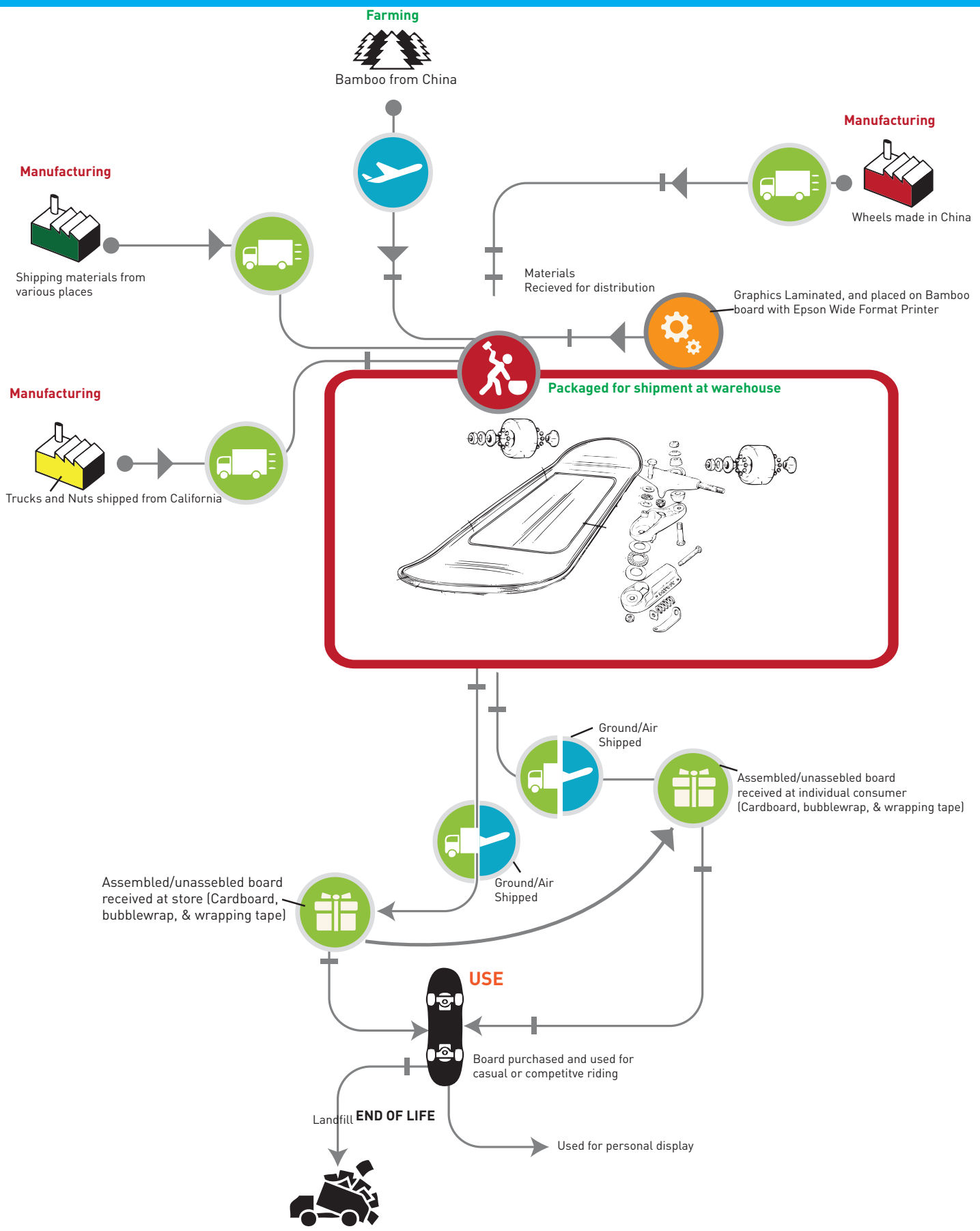
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BIOMIMICRY 3.8

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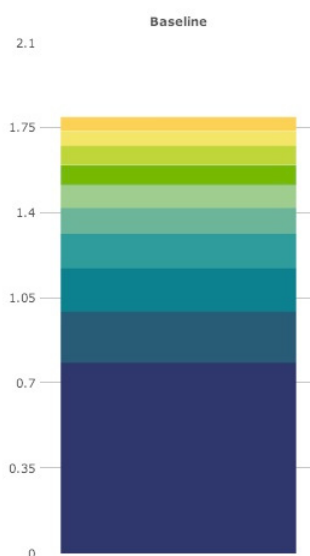
SYSTEMS MAP





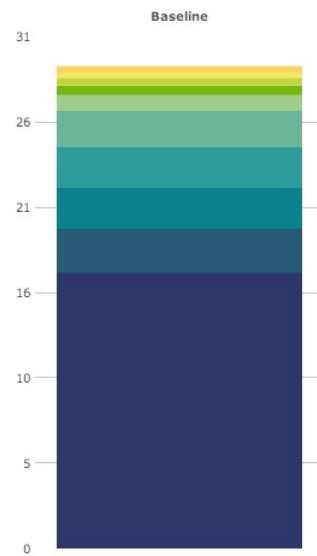
CURRENT BOARD IMPACTS

LIFE CYCLE ANALYSIS



Total = 2.1mPts/func unit

Input	mPts/func unit
Aircraft, freight, <4000 mi	0.784
Epoxy resin, liquid	0.210
Turning, steel	0.178
Bamboo 3 layer carbonized plywood	0.142
Aluminum, cast, precision sand casting/kg NREL /US	0.106
Aluminum, cast, precision sand casting/kg NREL /US	0.0954
Turning, steel	0.0810
Steel, converter, low-alloyed	0.0796
Stainless steel, austenitic	0.0625
Turning, chromium steel	0.0554



Total = 31 CO₂ eq. kg/func unit

Input	CO ₂ eq. kg/func unit
Aircraft, freight, <4000 mi	16.7
Bamboo 3 layer carbonized plywood	2.66
Epoxy resin, liquid	2.48
Aluminum, cast, precision sand casting/kg NREL /US	2.46
Aluminum, cast, precision sand casting/kg NREL /US	2.21
Stretch blow molding, plastics	0.968
Turning, steel	0.576
Cold impact extrusion, aluminum, 5 stroke	0.438
Cold impact extrusion, aluminum, 5 stroke	0.395
Steel, converter, low-alloyed	0.355

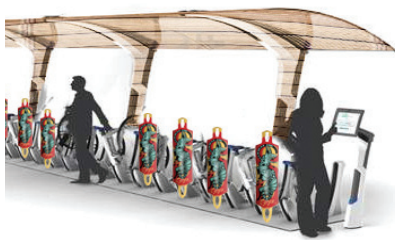


TOP 6 DESIGNS

The MCAD Team brainstormed multiple ideas to develop solutions that addresses the concerns of the Design Brief. Below are the top 7 choices.

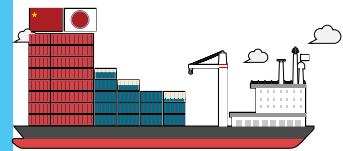
SHARE BOARD

a program to gain exposure for the company, the use of longboards as a commuting option and the board sharing program will focus on getting people out of their cars and to get some exercise



LOCAL BAMBOO

Two fold benefit to the environment first by reducing shipping distance and buying as locally as possible it keeps the funds, jobs and production in the North America. More importantly is the way the bamboo is process mechanical versus chemical treatments.



SHIPPING

Utilizing more trains and minimizing air freight. Which reduces the amount of carbon output associated to Rayne receiving and shipping the products



ENERGY-LED

Using LED lights as a means for the company to reduce the amount of the energy outputs from its building. Currently Rayne uses the traditional fluorescent light bulbs, LED will reduce electricity use while maintaining or improving the functionality of the lighting system



HYBRID BIO

Processing and mechanical characterization of bamboo fiber reinforced PLA with microfibrillated cellulose, which also allows for recycling other boards and bamboo into the bamboo used here.



PACKAGING

Create standard of how all packages are ship to consumers that creates a brand of how Rayne boards are presented to the market while reducing the materials needed.





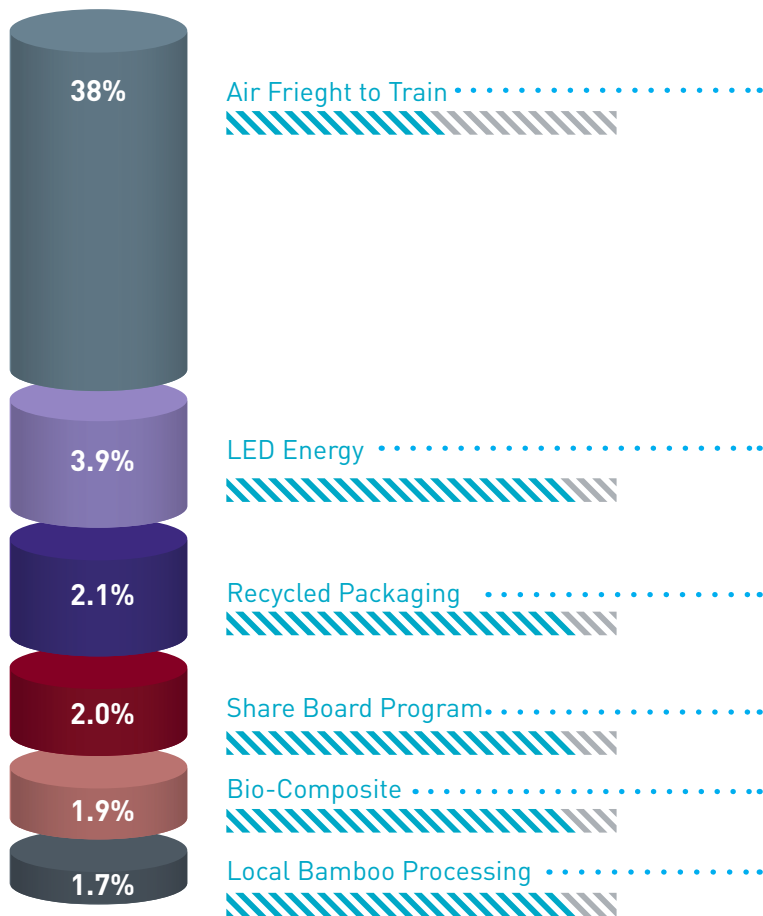
LIFE CYCLE ANALYSIS

For our ideas we created infographics that demonstrates the life cycle analysis results for each suggestion. The graphs show the environmental impacts and the carbon footprint for each suggestion.



Performance Improvements %/mpts

LCA Assumptions



Winning Designs

Our design winner were Board Packaging, Local Bamboo, and Honey-comb Bio-Composite.

Winning Designs

The ecological impact of the Board Packaging is that currently there is not a shipping package and having one will eliminate bubble wrap, packaging tape and speed up the shipping process for the company while increasing the end user experience and look better under a Christmas tree. The Local bamboo from farmed bamboo will reduce shipping, replace chemical treatment with mechanical and help sustain China native grasslands and habitants. The Bio-Composite will allow for recycling of the bamboo and to reuse old boards from the buy back programs in the new boards as well as strength the boards and allowing them to thinner and stronger.



BOARD/WHEEL PACKAGING

100% Recyclable Box- The Rayne Board package box is a 100% post consumer & post-industrial waste cardboard material that is fully recyclable and biodegradable. The provides the capability to print high quality graphics and show case the board to potential consumer with instant gratification. The material is durable for shipment and is extremely cost efficient.

Reduction: 50% materials, due to not eliminating bubble wrap, tape, and cardboard.

Time Reduction: 65% time reduce due to minimizing the process need to prepare packaging.



BOARD/WHEEL PACKAGING

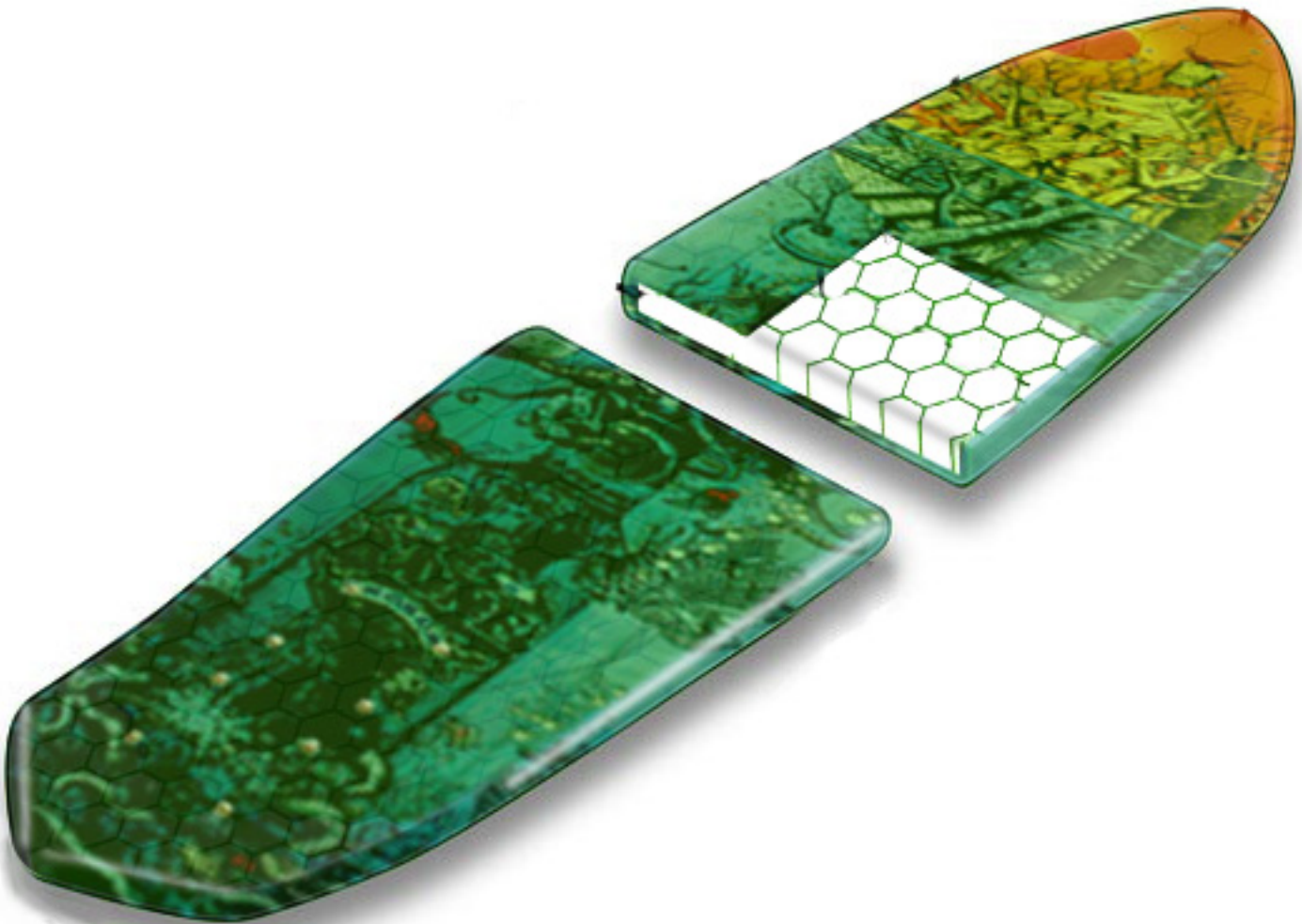


BIO-COMPOSITE



BIO COMPOSITE BOARD

2. Bio-Composite- The bio-composite allows for the integration of naturally derived materials, and strengthen the board while replacing chemical adhesives with compostable water based chemicals such as poly-lactic acid and microfibrillated cellulose which locks more tightly between the bamboo fibers than bamboo plywood is currently.



LOCAL BAMBOO

3. Local Farming (North America)- Using locally farmed and processed bamboo, is superior in supporting the local economy, reducing shipping distances and energy use. As well as using less intrusive chemical processing which is controlled in the United States. While preserving the China's natural grasslands (which have been over-harvested and are increasingly encroaching into wild areas due to increased demand).





PHOTO CREDITS

Cover Page:

wrightmoment.com