

Meet The Team

Faysal Ariss
Reentika Awasthi
Kabir Bhatti

Ashley Blodgett
Ricky Shen
Sean Smith

Stage 0

Understanding the Problem

The chair must be constructed entirely from a flat 4x4 ft. piece of cardboard that will hold a 4-6 year old Canadian child. The chair will be used in an emergency shelter in a relief situation. The chair will allow the children to play in a contained area, make connections with other kids, and have something to call their own.

Stage 1

Determining Stakeholder Needs

NGO



The company, NGO is responsible for selecting the final design based on the criteria. Their needs include:

- Low production cost (E)
- Ease of Transportation (E)
- Durability (E)
- Meets other stakeholders' needs (E)
- Recyclable (T)
- Safe (T)

Designers



As the designers, we want to exceed the criteria and build a functional and engaging chair for the children. Our needs include:

- Minimal tools to assemble (E)
- Design approved by NGO (T)
- Quick to build (E)
- Meets other stakeholders' needs (T)

Staff at Shelter



The staff will aid in construction of the chair and oversee their use in the shelter. Their needs include:

- Easy assembly (T)
- Lightweight (T)
- Durable (T)
- Contained (L)

Parents



The parents care about the safety and engagement of their children. Their needs include:

- Easy/Quiet assembly (T)
- Appeals to and engages children (L)
- Safe (T)
- Takes up minimal space (T)

Children



The children are the primary users of the chair. Their needs include:

- Suitable for varying ages (4-6) and sizes (T)
- Engaging to build and use (E)
- Variety of uses and components (L)
- Durable (T)
- Easy assembly (E)
- Customizable (E)

****E - Expressed Needs, T - Threshold Needs, L - Latent Needs****

Stage 2

Idea Generation

We used C-sketching, a process of collaboratively sketching individual ideas through a group work session. to create a variety of solutions. Each concept had their own advantages and disadvantages but were ignored during the generating phase to produce maximum variety.

After this, we individually sketched prototypes of our chair as shown, followed by making physical prototypes.

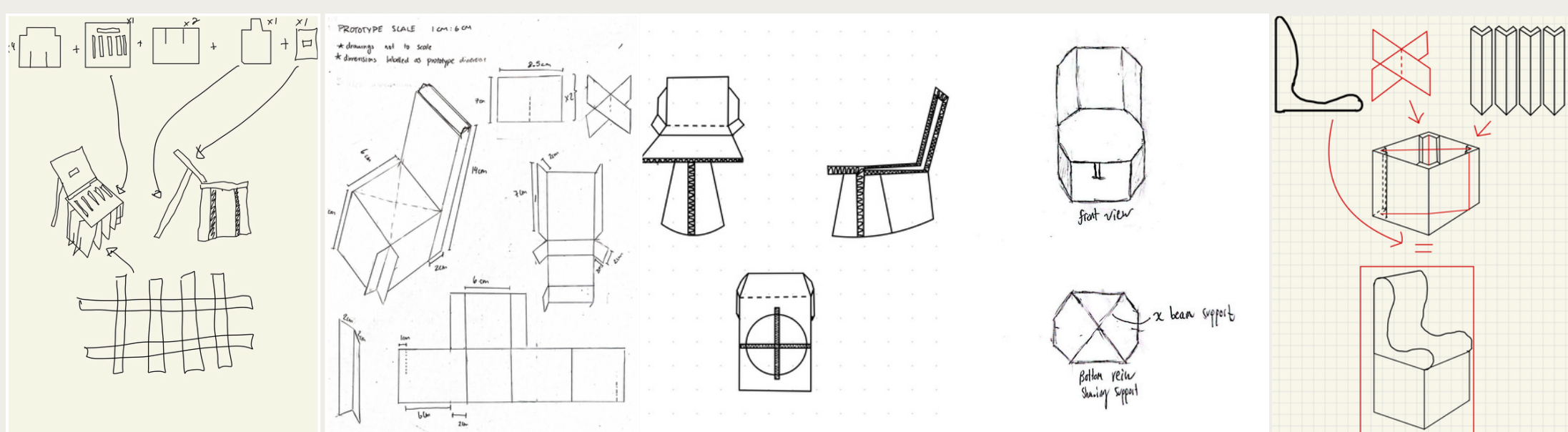


Figure 1: Prototype Sketches

RELIEF LOUNGER

FINAL DESIGN

Key Specifications

- supports at least 100 kg
- assembly time under 60s
- aesthetically pleasing
- comfort: height and width of seat to fit a child
- uses limited amount of cardboard

Back rest

A simple backrest connected to the base of the chair allows for a cardboard-efficient and lightweight design without the sacrifice of stability. Folded on to itself so that it is double the thickness and running parallel with the inside liner, increasing the strength.

Figure 3: Final Design



Grid-like structural support beams

The cross sections allow for better weight distribution, resulting in more strength and durability. The cardboard runs parallel to the liner since our initial tests with paper showed it maximized strength.

Foundational Piece

With a single piece connecting the base of the chair to the seat the chair is more portable, quicker, and more simple to set up.

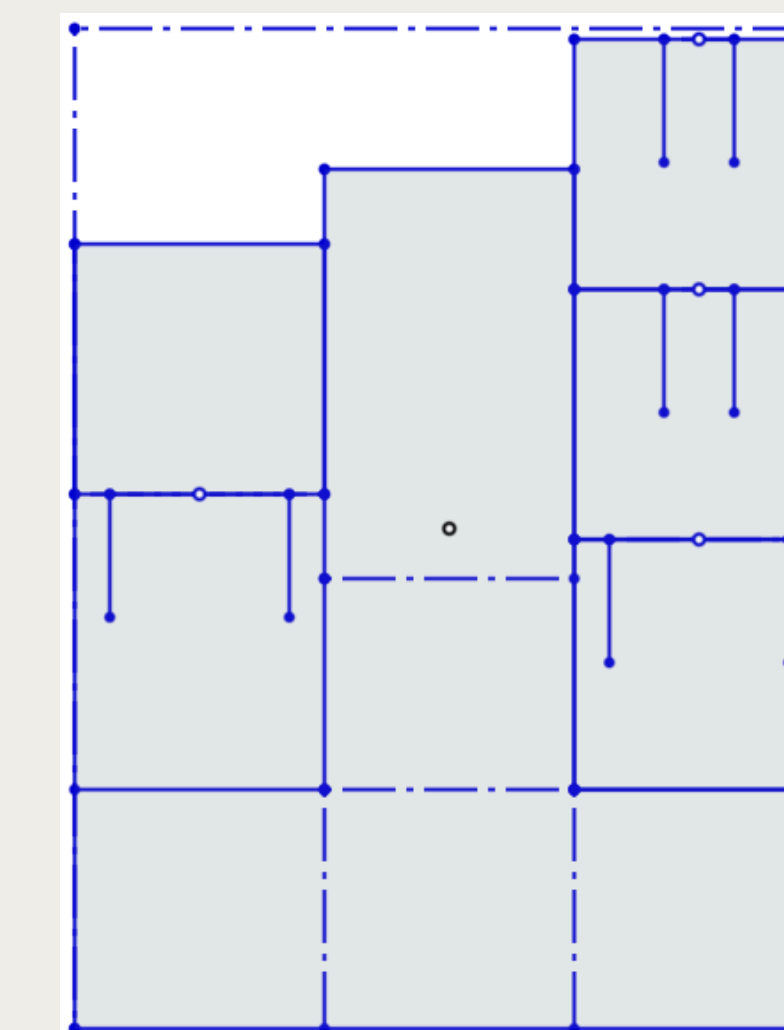


Figure 4: Cardboard cutout pattern

Interactive design

to keep children amused & entertained. A coloring playground and fun maze which can be filled in using markers supplied by the facilities or traced by their fingertips.



Figure 5: Final Design (back)

Stages of Prototypes

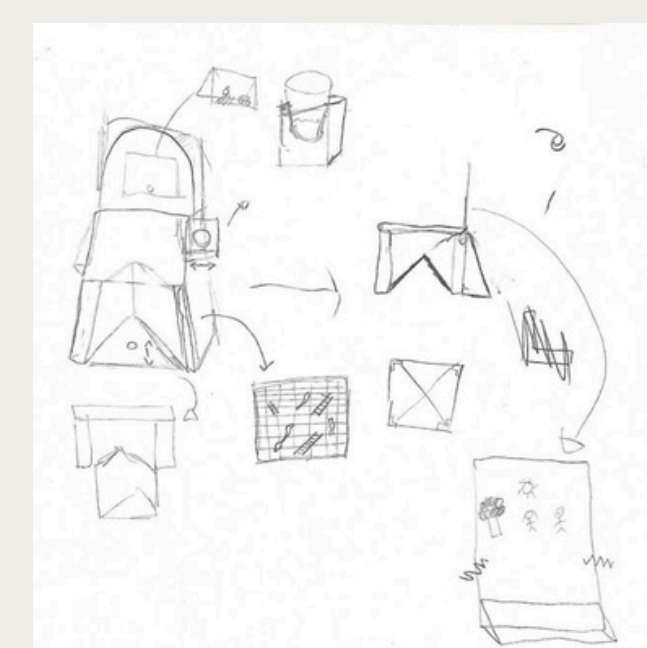


Figure 6 :First C-Sketch

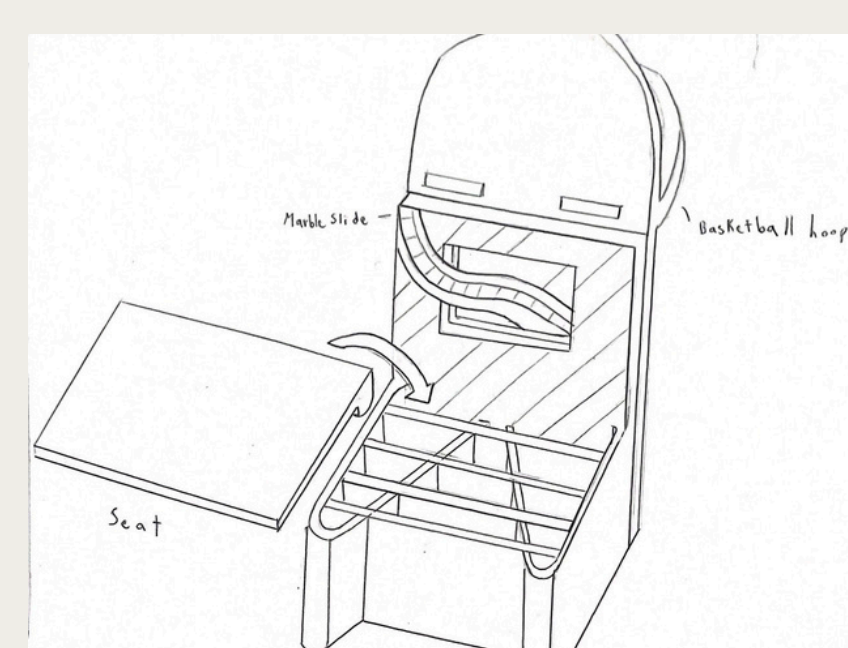


Figure 7: First Sketch

Testing Prototype

First Prototype

Final Prototype

J-2

Stage 3

Identify Most Promising Solution

After developing a set of diverse ideas for our chair model, we needed to begin eliminating and choosing a design to further develop.

1. We first screened & ranked our designs regarding our requirements & evaluation criteria.
2. We then conducted verification, to ensure all designs met the stakeholder needs.
3. To score designs, we used the borda count voting method as shown below.

Individuals Ranking	Concepts					
	Faysal	Ashley	Reentika	Kabir	Sean	Ricky
Faysal	2		1	1		
Ashley	2		2			
Reentika	2			1		1
Kabir	2		1	1		

Figure 2: Scoring table

Faysal's prototype was deemed the most promising, so we moved into stage four to develop and improve it further.

Stage 4

Develop & Test

We selected Faysal's design as a foundational final design, but incorporated stronger elements of other chairs to refine and optimize our final design. (Refer to *Final Prototype*)

Reasons for selection included:

- best balance between aesthetics and structural integrity
- best balance between cardboard used and strength
- easiest to assemble
- exceeded the evaluation criteria and stakeholder needs
- other designs lacked strong back rests, and/or were complicated to build

The simple, yet strong layout made us decide on this design to fully develop.

Stage 5

Final Product & Future Steps

Moving on to stage five, we began to build our final chair, while making small changes as needed. As a reflection, we would have spent more time during ranking and scoring to make these changes earlier when it's easy rather than later it becomes more difficult.