

ID PORTFOLIO ::

"GOOD DESIGN IS NOT ABOUT WHAT WE CAN DO, ITS WHAT WE SHOULD DO" - Richard Seymour

Ayan Bhandari :: Virginia Tech :: Tinkerer, Hacker, and Human Centered Designer

PROJECT 0

After the Impact of a Natural Disaster, it takes donated blood 24 hrs to reach patients who need it in 2.

How can we make blood donating and testing smarter and more efficient?



PROJECT DETAILS

THE ONLY WAY TO GET NATURAL DISASTER VICTIMS A BLOOD TRANSFUSION ON TIME AND SAVE THEIR LIVES.

Ayan Bhandari



Entry into the Design21 Disaster Relief competition and recipient of the most Popular Design award

RESEARCH WHATS THE PROBLEM?

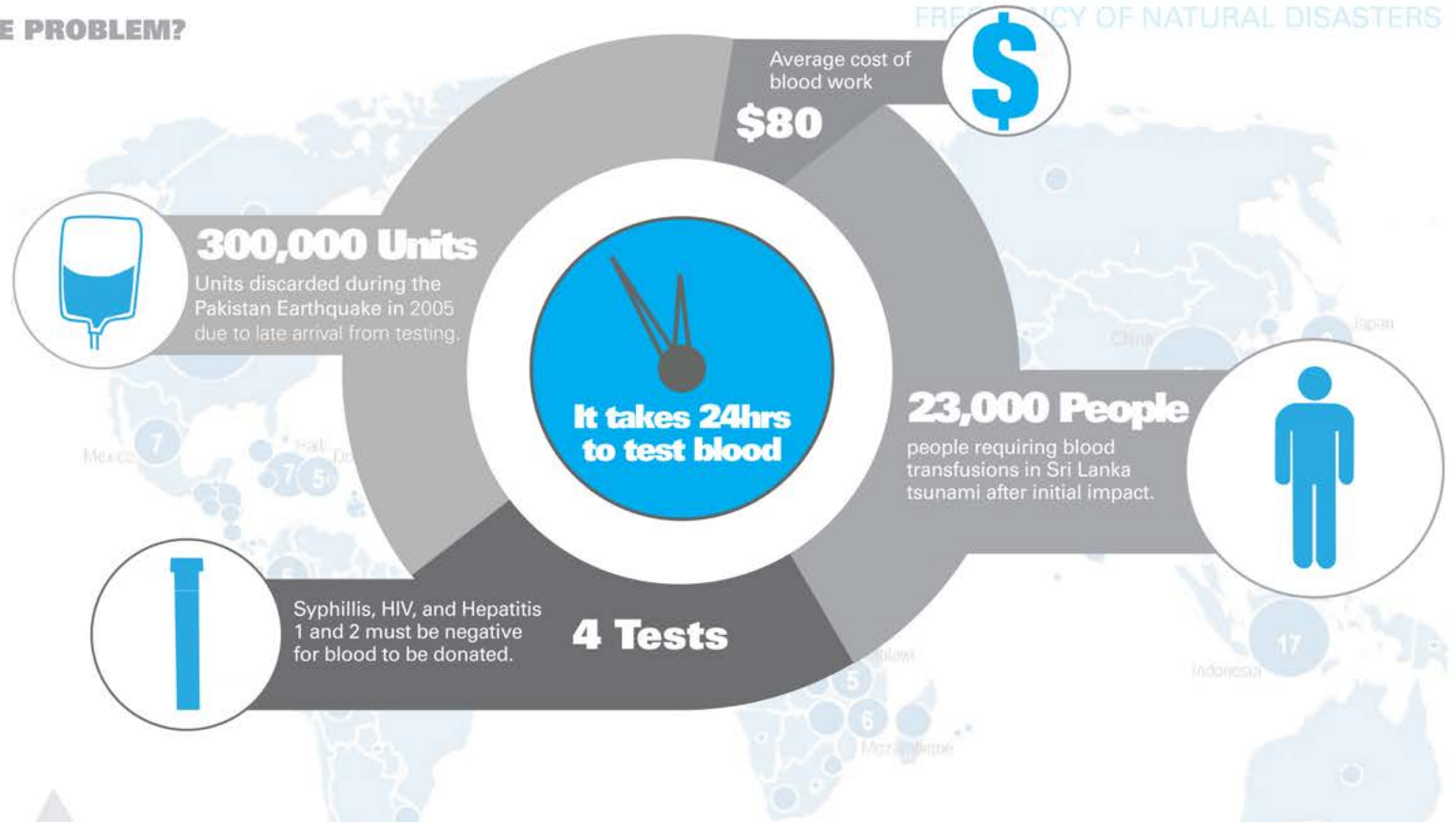
To get a better understanding of the current situation, three forms of research were conducted:

6 Case Studies

Process observations

Medical Requirements

FREQUENCY OF NATURAL DISASTERS



HOW CAN THE TESTING TIME BE REDUCED WHILE LOCALIZING MORE OF THE PROCESS?

STATUS QUO

1 PROCESS
3 LOCATIONS
5 STEPS



Prep patient and draw 4 vials for testing.

Attach tubes to blood bag via rubber-band and send to the lab.

Blood is tested within 24 hours and then stored.



RESEARCH FINDINGS

Localized testing process through rapid screen testing (below), which is already used with HIV testing + On-site observations became a resource for interviews with the stakeholders involved.

2 Site Visits

1 New Technology

Multiple Interviews



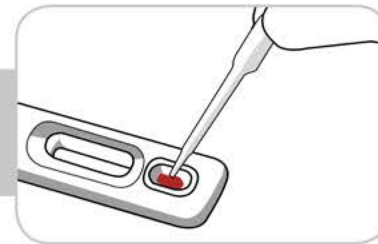
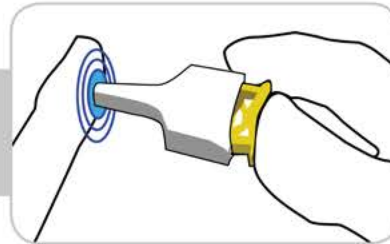
How can we consolidate the amount of equipment, storage, and disposal needed on a emergency hospital site?

THE FUTURE

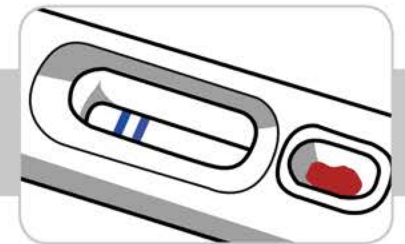
1 PROCESS
1 LOCATION
20 MINUTES



Take test kit out of box and use the lancet to prick your finger



Use pipette to draw blood and place in well. Wait 20 minutes



Use second well to read results.

RESEARCH EXPERT OPINION

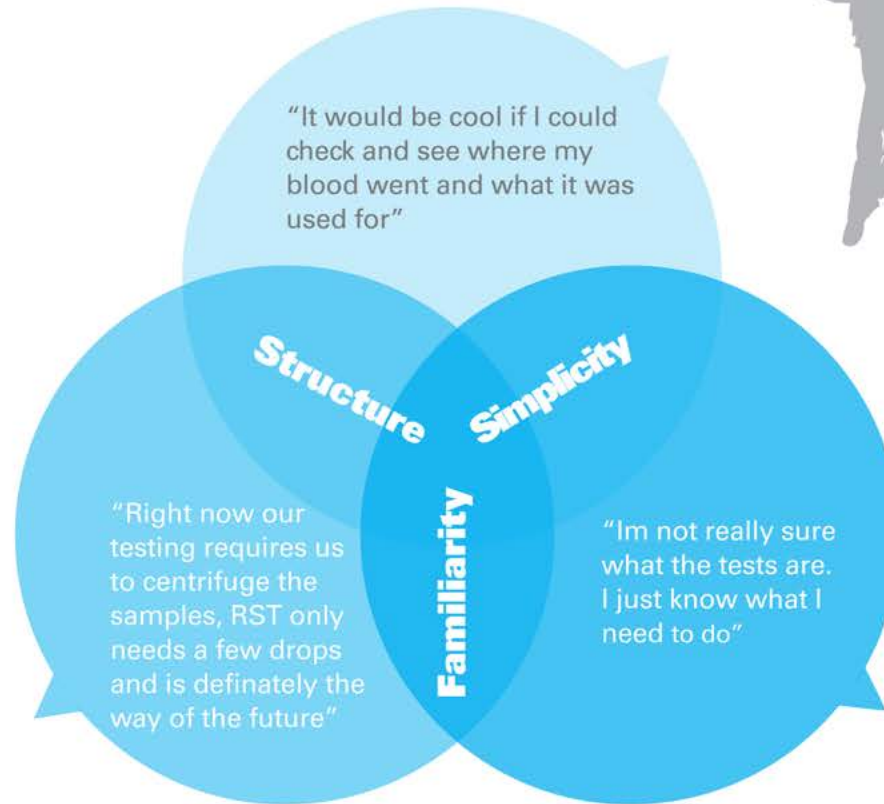
Interviews with lab technicians, blood donation workers and donors led to new insights that were taken into the concept phase.

10/10/2014

2 Site Visits

1 New Technology

Multiple Interviews

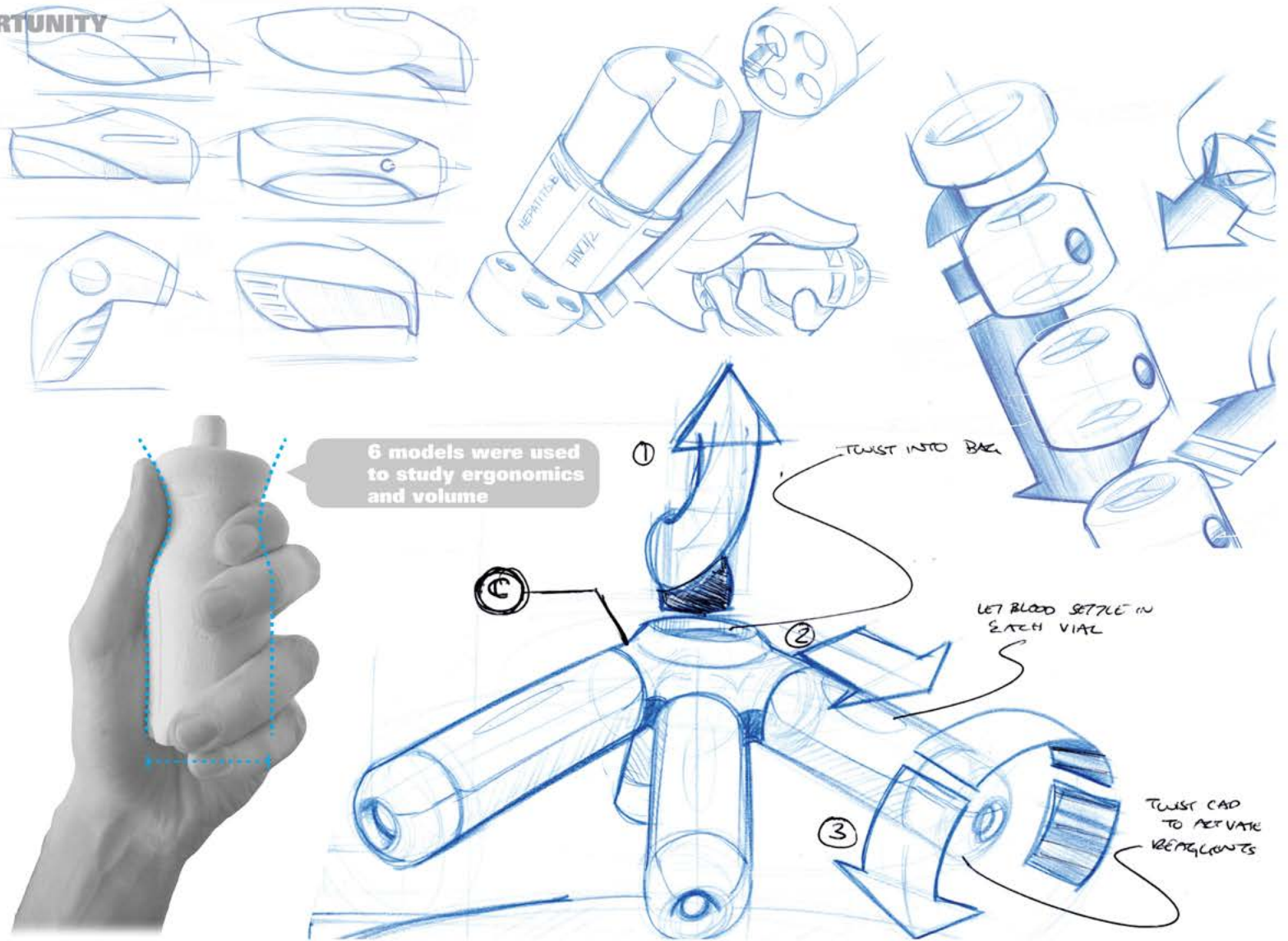


THE NEXT STEP

HOW CAN WE SYNTHESIZE ALL THIS INFORMATION INTO A PRODUCT AND SYSTEM THAT CAN BE VIABLE FOR FUTURE DISASTER SITUATIONS?

CONCEPTS THE OPPORTUNITY

Insights realized through foam models were used to determine overall volume and ergonomics while the sketches visualized functional concepts.



ALL IN THE NUMBERS

16 CONCEPTS
6 MODELS
3 INSIGHTS

4 2 0

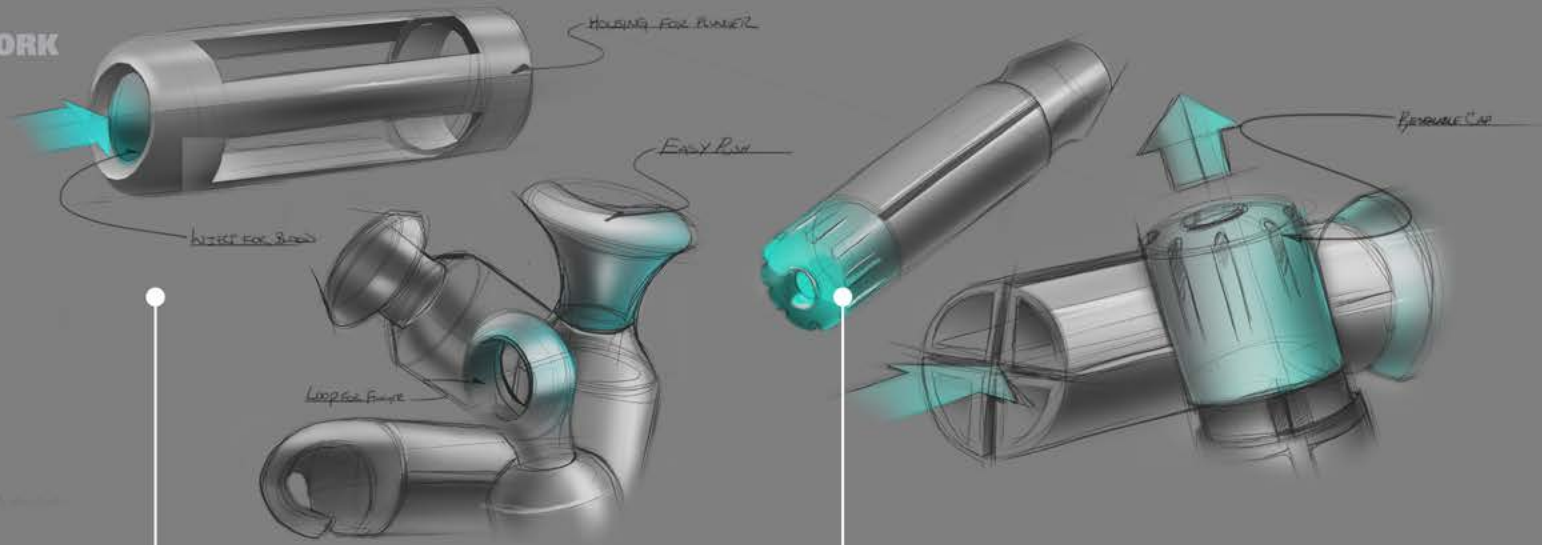
4 tests = 4 chambers = 1 tube

2 way system that allows reagent placement from one end and blood extraction from the other.

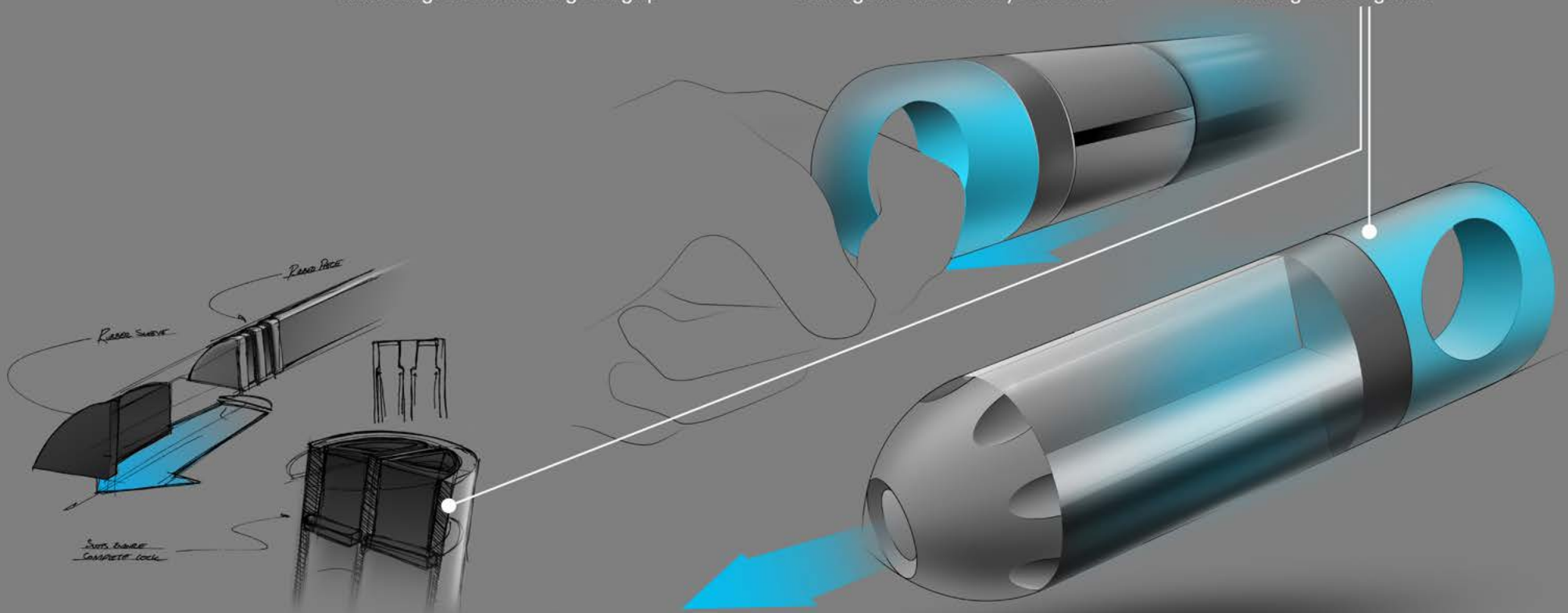
Chances for reading error with labeled chambers.

CONCEPTS MAKING IT WORK

In this sample of refinement sketches, each part of the design was iterated and developed. From the shape and feel of the handle to the mechanism of the one way valve system.



Extracting blood with a good grip Sealing the vile when you're done Putting it all together



CONCEPTS ENGINEERING

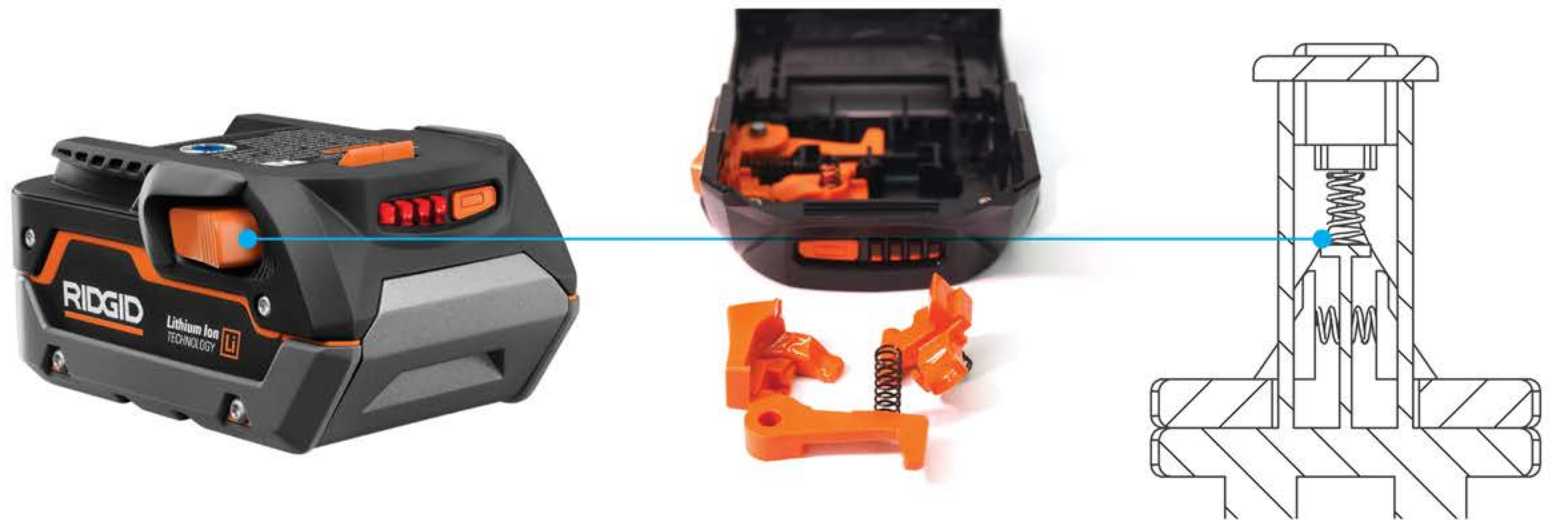
To readily pull a vacuum and dislodge the plunger from the body, engineering inspired by a ridgid battery pack was re-invented to work within the plunger itself.



ENGINEERING

ANALYZED

ADAPTED



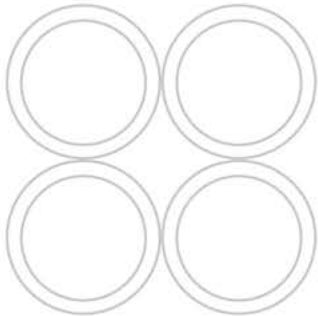
DESIGNED FOR PROTOTYPING

By realizing these internal mechanisms, a testable prototype can be created to simulate how the PRODUCT would be used. This proof of concept can help a user, or clients fully realize and criticize the design

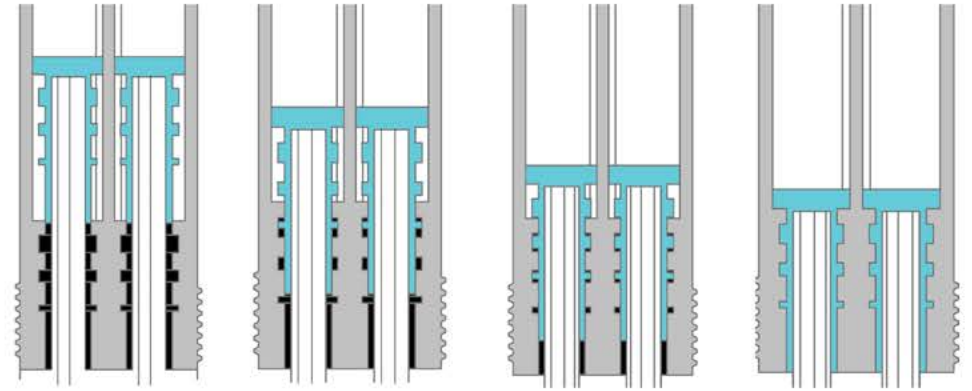
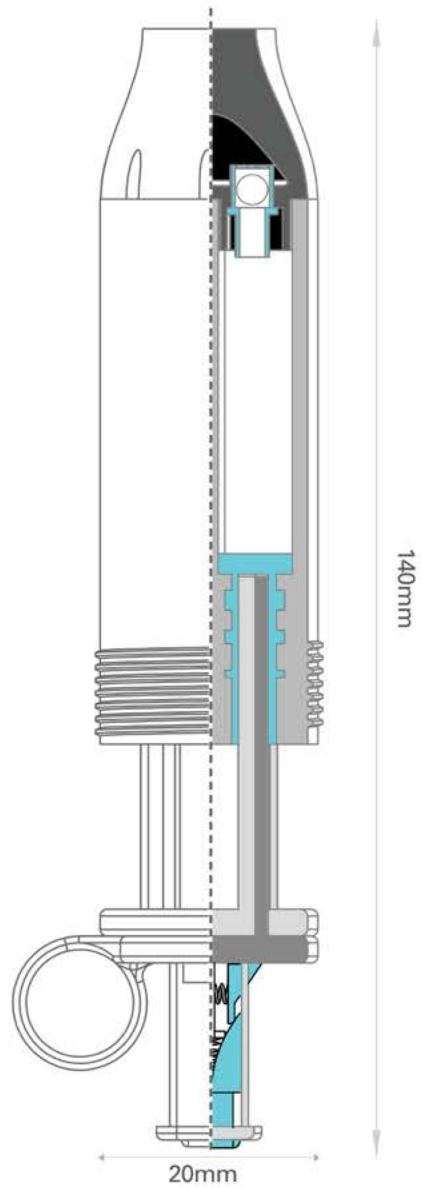
PROJECT 0 FEATURES



vs.



Smaller footprint
From 4 units to 1



Different size rubber tabs allow the rubber insert to bypass each level until it is fully sealed. The 3 levels ensure that the chamber is sealed. The top of the rubber inserts is exposed when the chamber is fully sealed, allowing the user to release the plunger.

THE SIMPLICITY

- Clear instructions and color show user what to touch
- Similar semantics to other blood drawing technology



PROJECT 0 C.M.F

On the right is a breakdown of the materials, color and finish of each component.



THE PLUNGER

Designed to use one plunger repeatedly to reduce cost and increase efficiency.

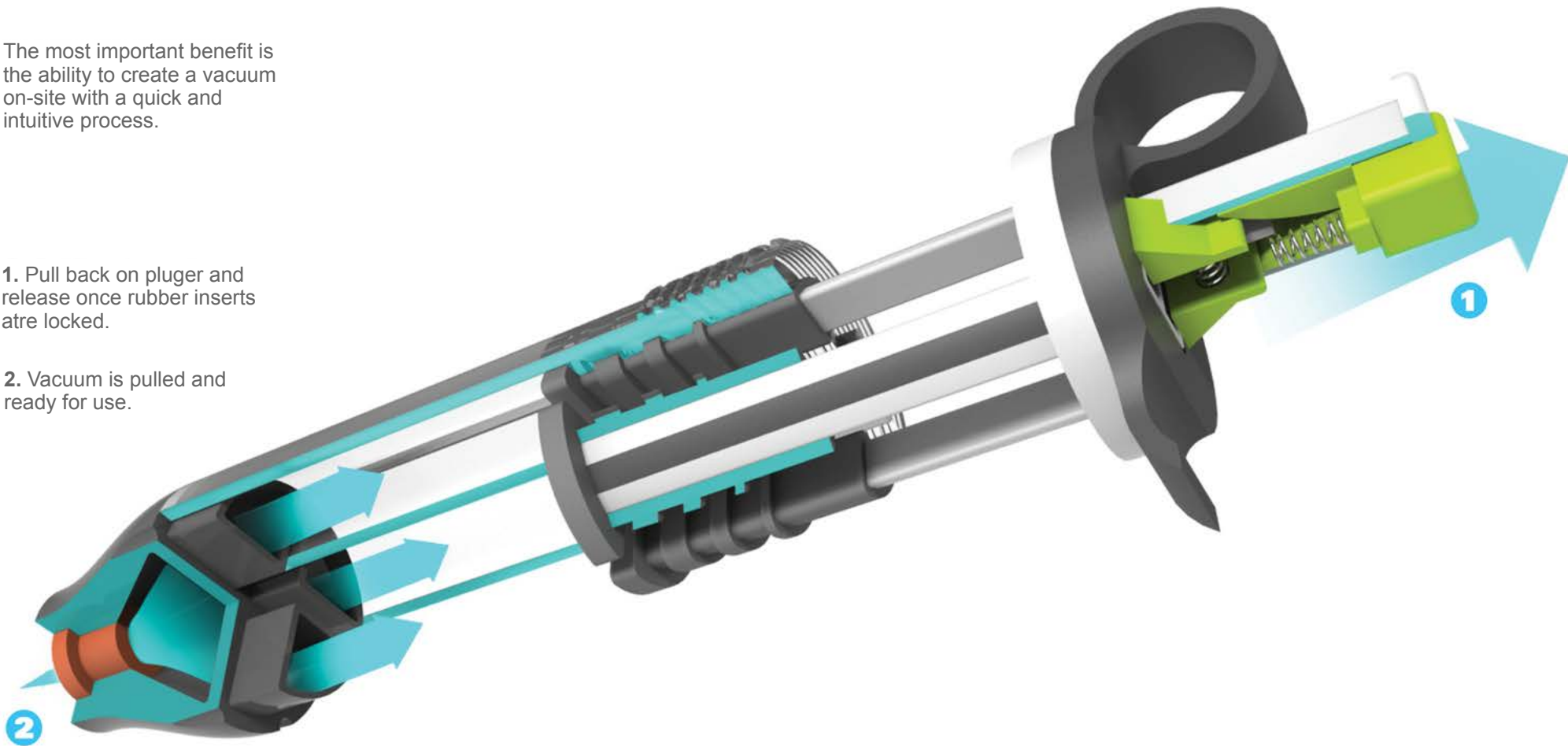


PROJECT O VACUUM

The most important benefit is the ability to create a vacuum on-site with a quick and intuitive process.

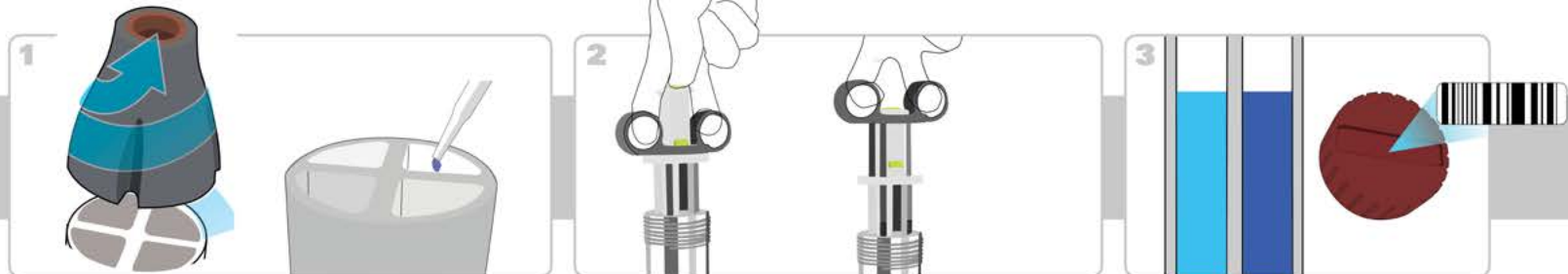
1. Pull back on plunger and release once rubber inserts are locked.

2. Vacuum is pulled and ready for use.



THE PROCESS

1. PREP
2. SET
3. TEST



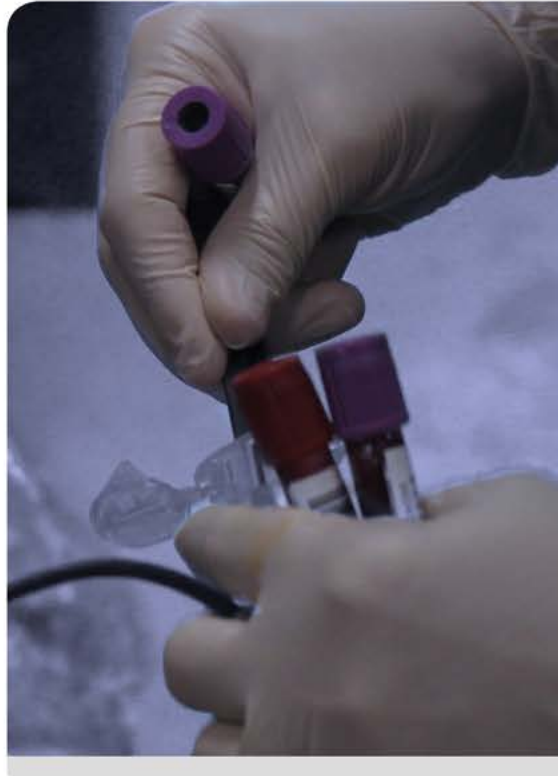
1 Remove the top and add the reagent for each test and replace the top.

2 Pull plunger until the rubber is exposed. Press the lime green button and continue to pull to release the plunger.

3 Let the test sit for 20 minutes and place a matching barcode to the bloodbag.

PROJECT 0 IMPACT

By moving to a one unit system, the process is faster and used with one hand.



STATUS QUO

RE-INVENTED

"Blood is that fragile scarlet tree that we all carry within us, we must treat it as such.."

Osbert Sitwell, English writer



M CHAIR

Trains have always been the most efficient form of transportation per human, yet in the second busiest metro in the United States (D.C) ridership is down and congestion is up.

How can we create a positive view of the DC Metro and increase ridership?



PROJECT DETAILS

THE NEW WAY TO GET PEOPLE IN WASHINGTON DC OUT OF CARS AND INTO THE METRO. CREATING A MORE EFFICIENT AND LESS CONGESTED CITY.

Ayan Bhandari :: Kees Luyendijk :: Zack Filbert :: Liz Stokley



Shortlisted :: Top 300 projects out of 8000 total entries

RESEARCH STATUS QUO

Observing the DC Metro from morning until evening brought valuable insights on what multiple travellers experience.



On Site Observations



WHAT ADVANTAGE CAN WE BRING TO PUBLIC TRANSIT THAT CARS DONT HAVE?



VS.



People that drive themselves to work **75.5%**

14% Emissions rising annually

Dollars spent on congestion in NYC in 2008 **2billion**

5,457 lbs of O2 per car/year

Ridership in the US and Canada dropped **1.7%**

70% less emissions by cities with Public transit use

THE RIDERS



Working man :: 30min commute from suburb :: Needs bluetooth capabilities

Urbanite :: Short rides to get around :: Needs more safety features

Tourist :: Primary mode of transportation :: Needs more accessible information

Student :: Gets to and from school :: Needs storage and social capabilities

RESEARCH OPPORTUNITY

Focusing on the drivers commute showed value that the metro could have that the car could not.

Trends

Car and Driver

The opportunity



Windshield: Views outside, **knowledge** of surroundings.

Air Vents: Allows **adjustment** of atmosphere.

Gauges: Keeps driver **informed** of diagnostics.

Navigation: Displays route and **ETA**.

Radio: **Entertainment** and news **updates**.

Leather Seating: **Comfort** and emotional use of **materials**.

Drives A4

30 minutes to commute

Uses phone to read emails at stoplights.

bluetooth options built into the car.

he earned his status and car, and shouldn't have to take the metro.



GET PEOPLE OUT OF CARS AND INTO THE METRO BY PROVIDING THE OPTION FOR PRODUCTIVITY AND A SENSE OF HIGHER STANDARD.

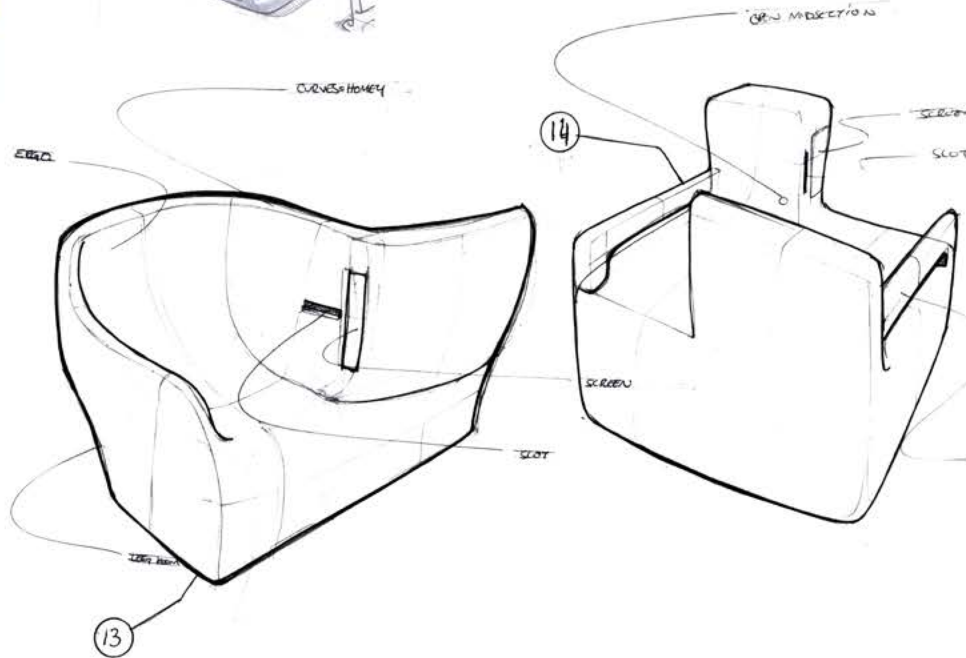
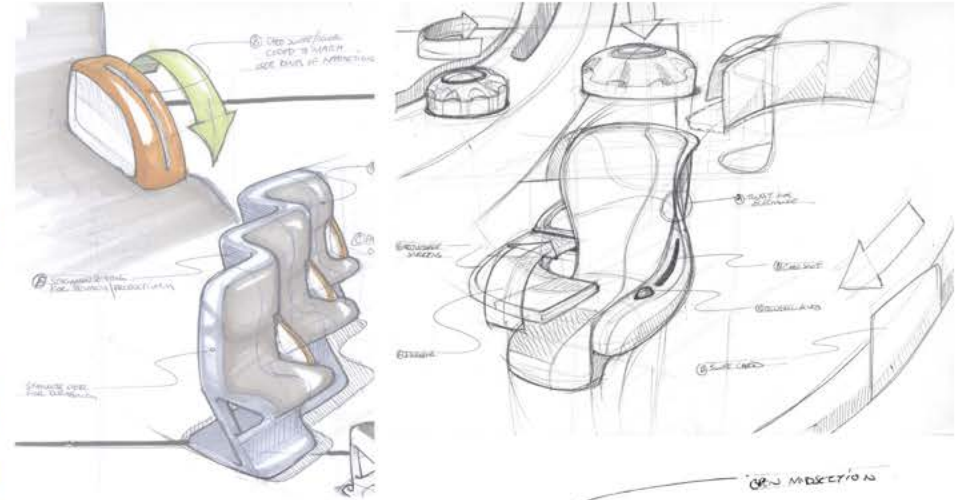
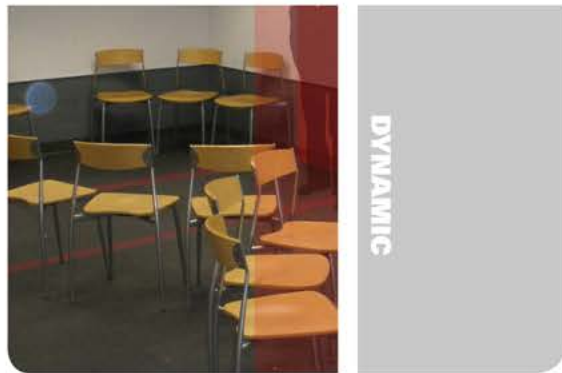
WHATS TRENDING

**MULTI-TASKING
CLOUD COMPUTING
PERSONAL TECH**



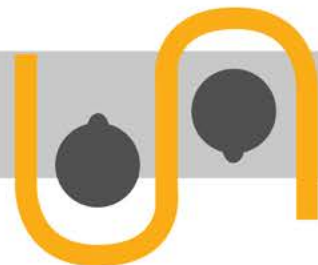
CONCEPTS SPACIAL

Spacial mock-ups and sketching helped decide how riders could be more productive, gain privacy, and also increase capacity.

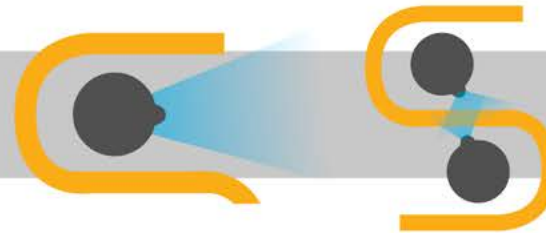


GEOMETRY IS KEY

ONE SHAPE, MANY DYNAMICS TO THE WAY YOU SIT.



Top view shows S shape of chair



By sitting close to one another while facing opposite directions, users can choose between privacy or social interaction

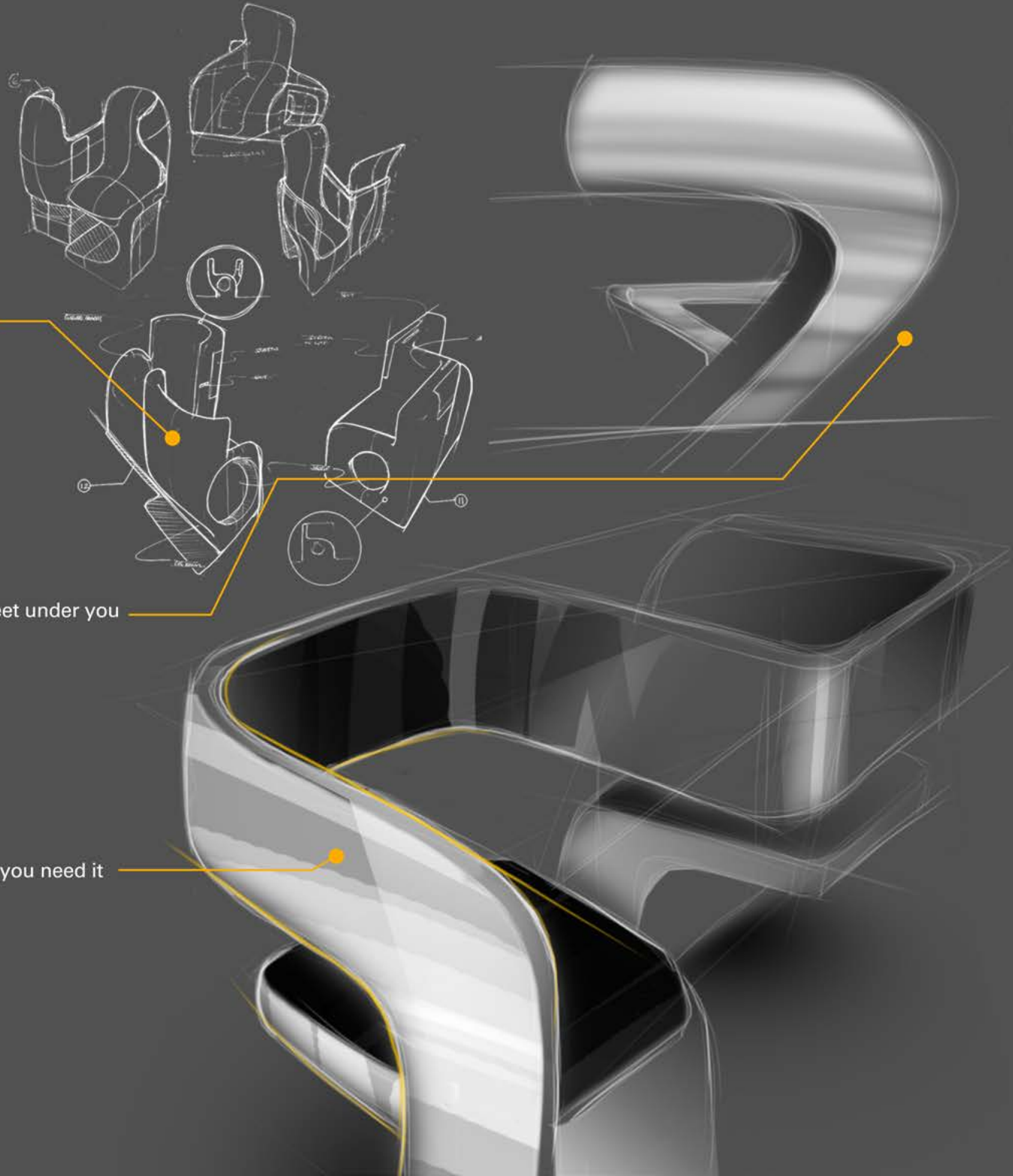
CONCEPTS REFINED FORM

The solution stays true to the s-form geometry, while focusing on ergonomics and placing material only where it is needed.

S form exploration

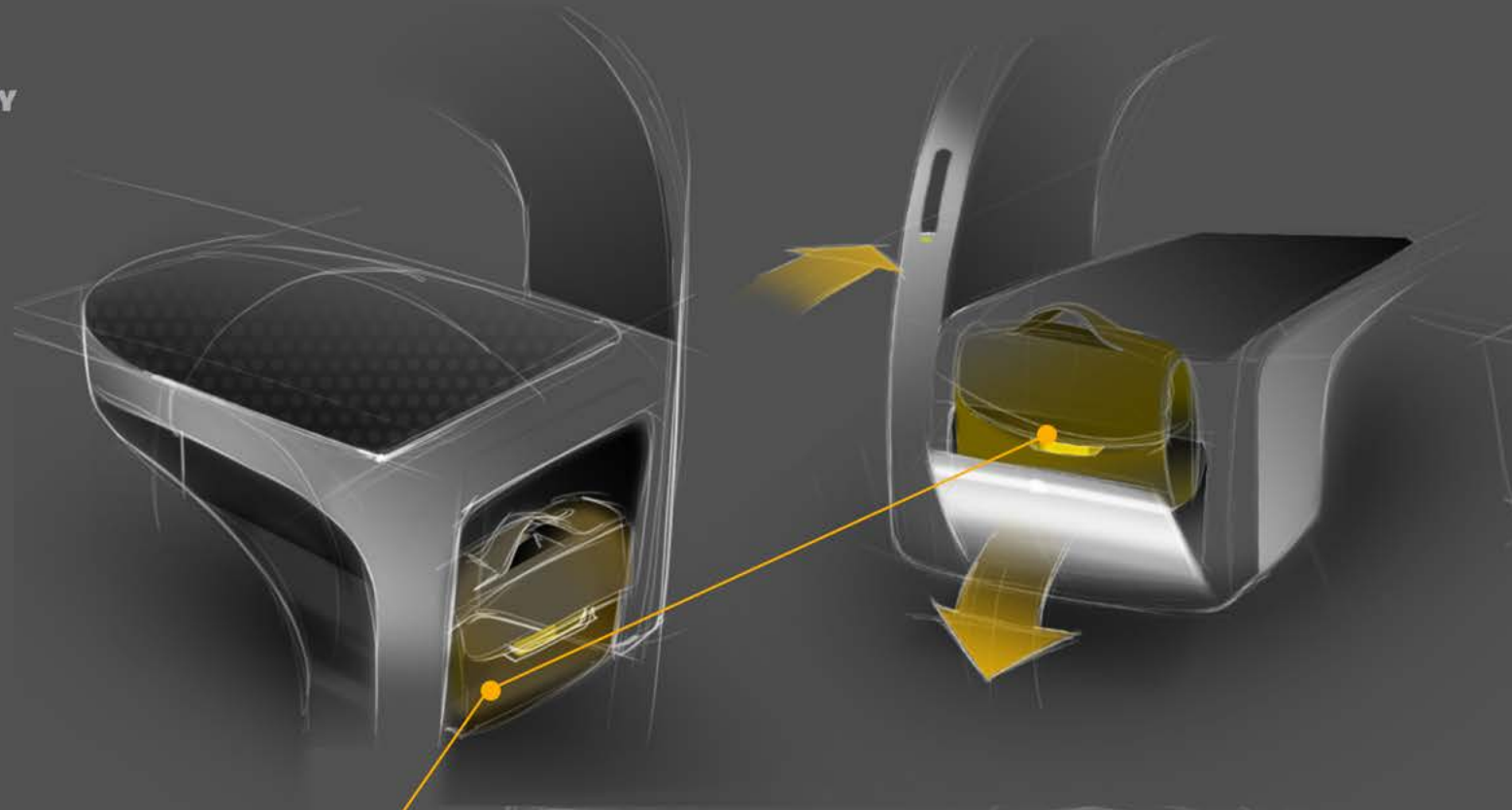
Space to get your feet under you

Material just where you need it



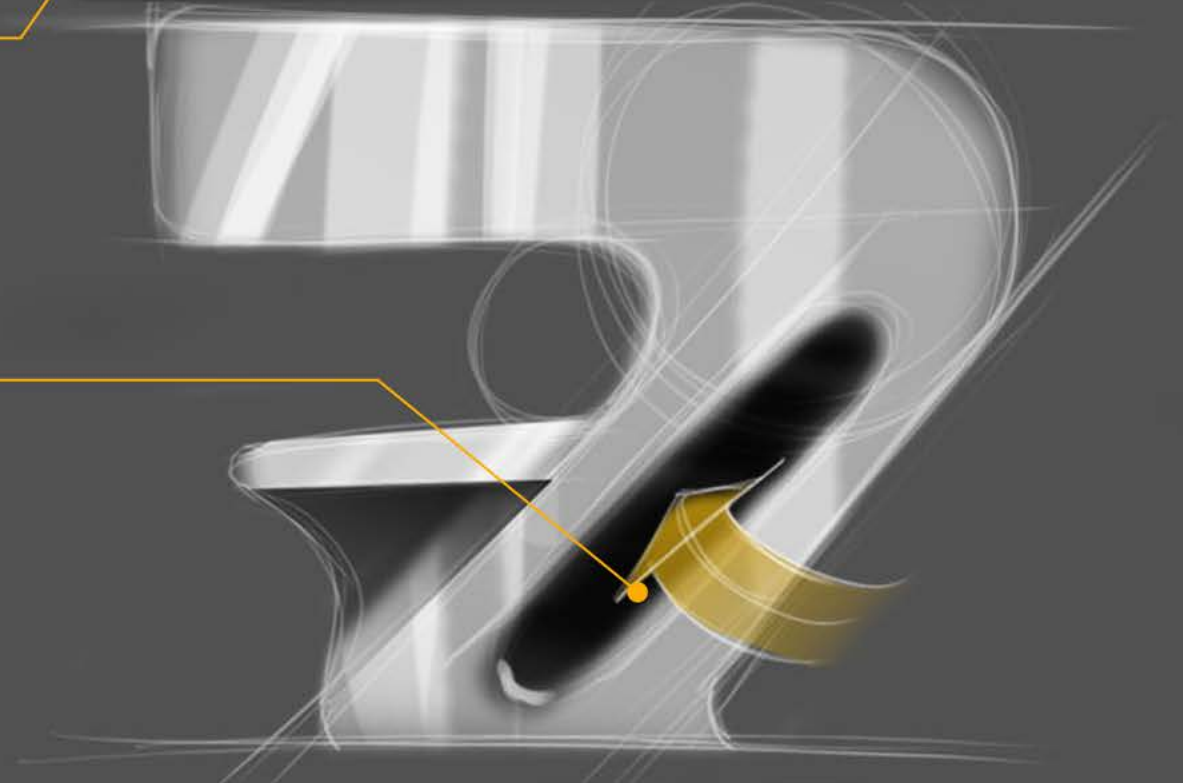
CONCEPTS STORAGE STUDY

storage solutions were developed to allow riders to keep things out of the way and prevent clutter when trying to work.



Storage underneath you

Storage that keeps your legs free



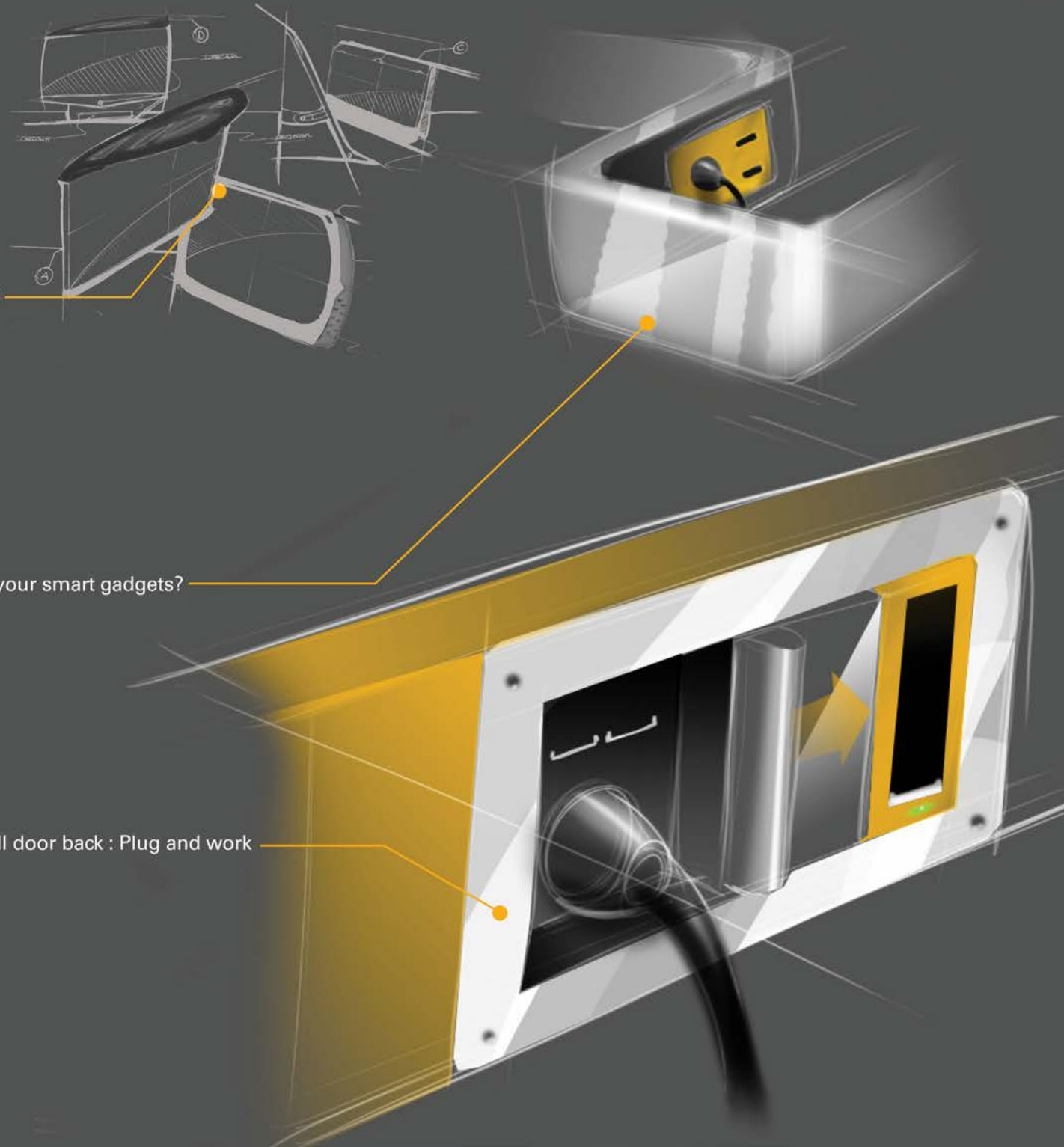
CONCEPTS YOUR TECHNOLOGY

For productivity, we first started to design a pop-out screen, but later moved to a plug and play solution to allow people to use their own products. This included two USB ports and a three prong plug port.

Built in Screens

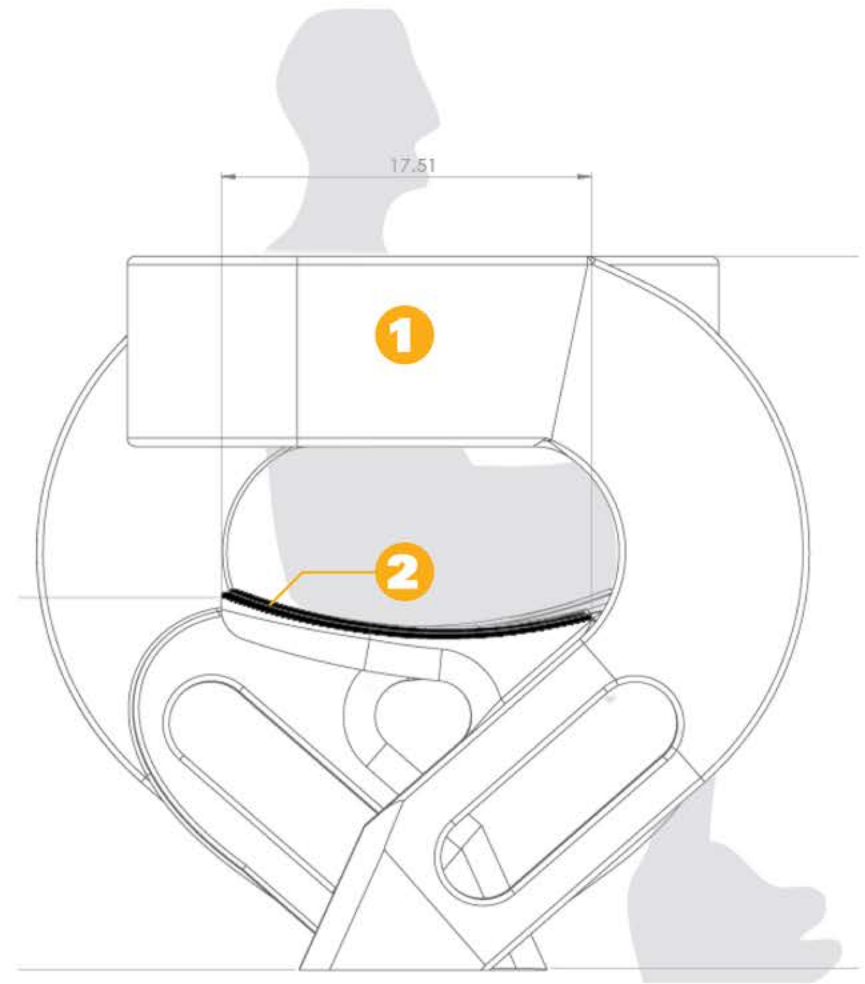
Why not bring your smart gadgets?

Insert Card : Pull door back : Plug and work



THE CHAIR ERGONOMICS

Instead of “re-inventing the wheel” we mimicked the ergonomics from the Caper Chair by Herman Miller for its comfort over a long period of time and its use as a chair in many innovation rooms.



MATERIALS

Using familiar materials and manufacturing is key when designing for the railroad industry.

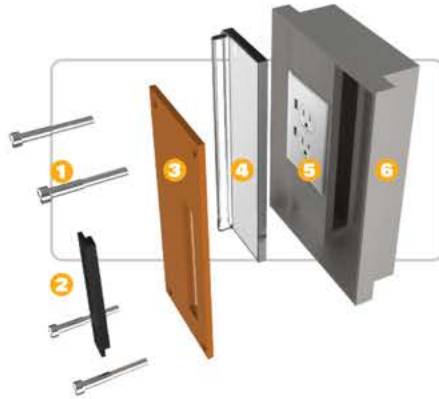
1 Roto-molded ABS for durability and lightweight.

2 Apolstered faux-leather provides a long lasting durability and easy clean up to remove bacteria.

THE CHAIR TECHNOLOGY

Top Left :: simple unit in each chair allows the user to use their own products for work. It houses 2 usb ports and 2 three prong plugs.

Right :: Chair is designed to be comfortable and private with enough space to work and store your carry on.



BUILT IN PRODUCTIVITY

- 1 Self-Locking Stainless Steel screws
- 2 Plastic Card Receiver
- 3 Plastic cover (color matching)
- 4 Frosted Glass sliding door
- 5 2 USB ports and 2 three prong plug ports
- 6 Stainless Steel component box



THE COLOR

Inspiration from high-end car interiors for the color of the chair gave it a high end appeal



THE CHAIR RESTRICTED ACCESS

People have their own way of being productive, all we have to do is provide them with the opportunity to have access to their technology.



THE PANEL

Using a specialized metro card, users can pay for access to use their gadgets.



Red light indicates that door is locked



Insert special metro card to access panel



After card is received, slide door open and use ports.

THE CHAIR ADAPTABLE

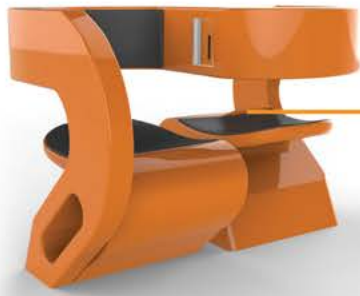
The brand language for the chair was adapted across the board in order to adapt to ADA standards. Perch seating was developed for increasing the overall space used in the car.



Use it when its to crowded...



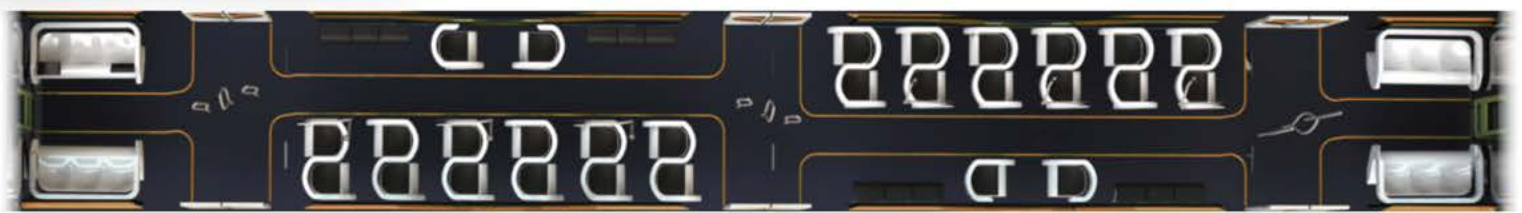
Use it for accesability...



Use it for productivity...

THE LAYOUT

With the dimensions of the new chairs and the addition of the perch seating, we were able to create 40% more room in the car.



THE CHAIR MOVEMENT

The advantages created by the new design allow for higher flows of traffic and an increase in personal space without sacrificing capacity



The angled leg allots more floor space when seated and allows people to have their feet under them when they get up.

move back and forth through the space without interfering with others.

Room between the edge of the seat and the edge of the chair allow users to never change the amount of room occupied

LAXMI

Women in India support families on \$2 a day. Grameen bank has created a micro financing system to bring them out of the poverty cycle, but it is unsuccessful.

How can we teach illiterate women the benefits of micro-financing in groups?



PROJECT DETAILS

THE BEST WAY TO HELP ILLITERATE AND IMPOVERISHED WOMEN CREATE A BETTER LIFE FOR THEM AND THEIR FAMILIES.

Ayan Bhandari :: Sara Chowdhury :: Lina Garada :: Kees Luyendijk



ICSID World Impact
Prize Finalist



IDEA Bronze Award

RESEARCH MICROFINANCING

We asked: What is micro-financing and how does it work? How do we convince people who make \$2 a day to save some of it?

CURRENTLY...

1. Group meets once a week
2. Everyone donates a fixed amount of money to the group
3. NGO provides accountant to keep ledger.
4. When someone wants to start a business, they are given the money and pay it back with interest.



SLOW PROGRESS

WHY IT ISNT WORKING.



ILLITERACY

50% of women in India are illiterate



FORESIGHT

20% of women dropout in the first year because they cant see the long term benefits



DEPENDANCY

100% dependency on Accountant

CONCEPTS TEACHING

Through role playing and prototyping we worked on the tactile experience of the product. We worked with, and recieved feedback from women in Self Help Groups in Rajasthan, India.



FEEDBACK FROM REAL GROUPS

INCREASED TACTILLITY



ROLE PLAYING



CHANGING IT UP

WHY OURS DOES WORK.



TECHNOLOGY

90% of Indians own cell phones. We used them to get a photo ID that can be brought to each meeting



ENTERPRISE

50% of women in rural india are involved in the textile industry

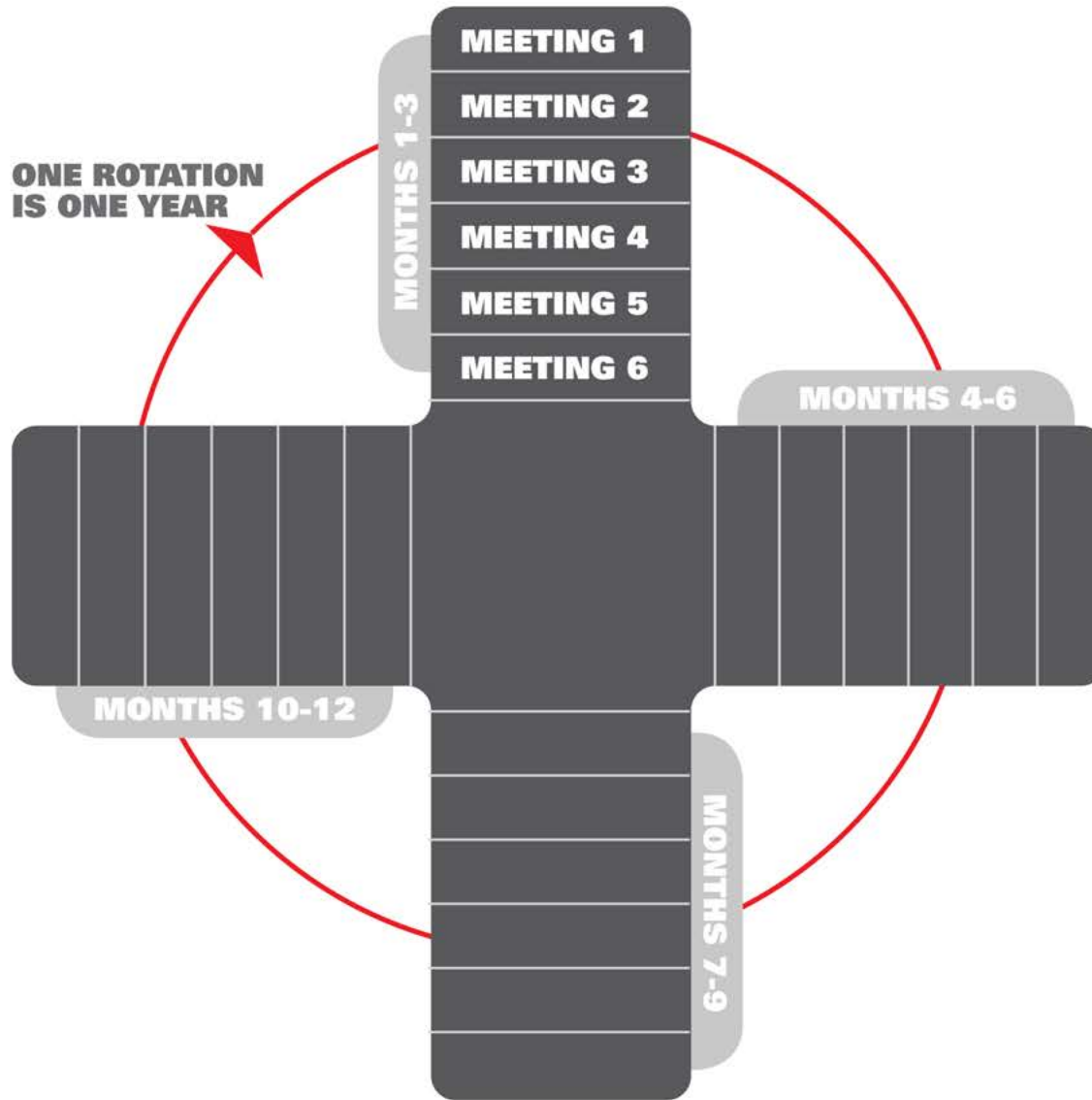


CULTURE

100% inspired by Indian culture

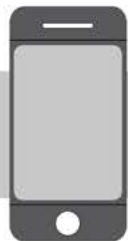
LAXMI BREAKDOWN

The graphic shows the breakdown of the laXmi gameboard and how it works. Moving within each panel gets you through the months while rotating around the whole board simulates a year.



THE TOOLS

ALL YOU NEED IS



**SMART
PHONE**



LOAN NEED CARDS



RUPEES

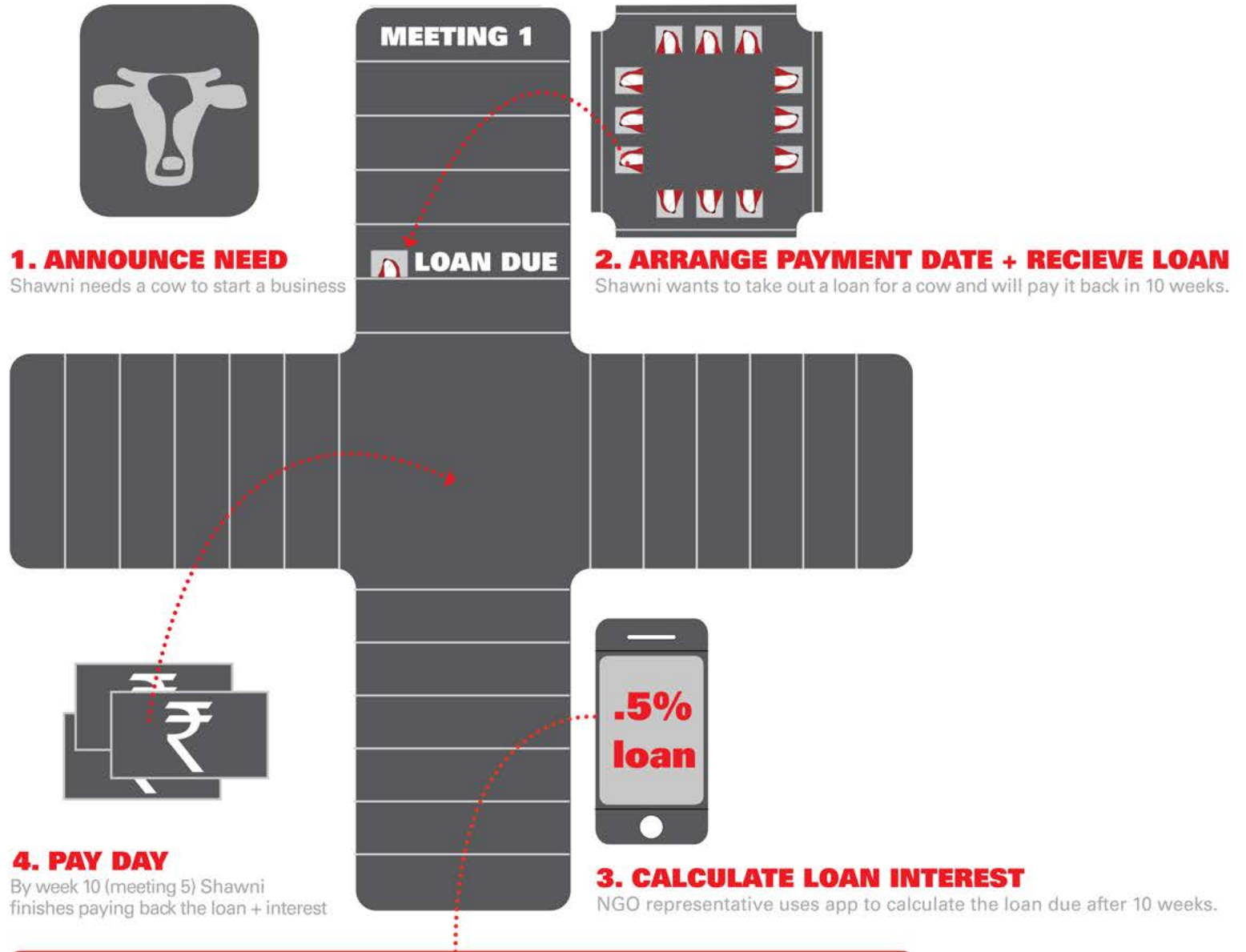


PHOTO ID

THAT SIMPLE....

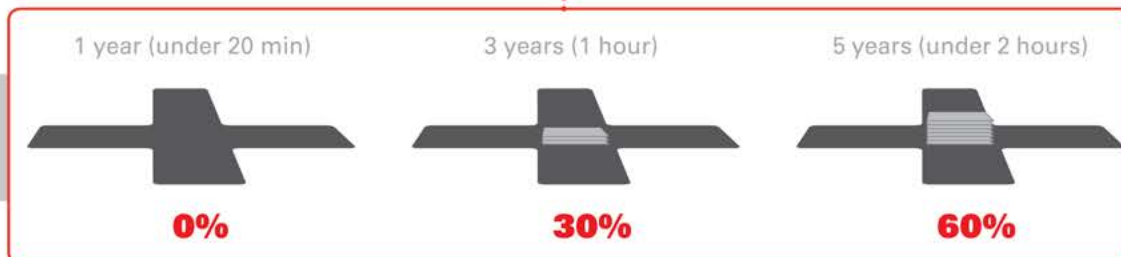
LAXMI THE PROCESS

A simple 4 step process simulates the benefits of loaning as much as possible. Using an app developed by a team at Virginia Tech, more loans can be simulated in a short period of time.



THE PROGRESSION

SIMULATION PROGRESSION SHOWS REWARD

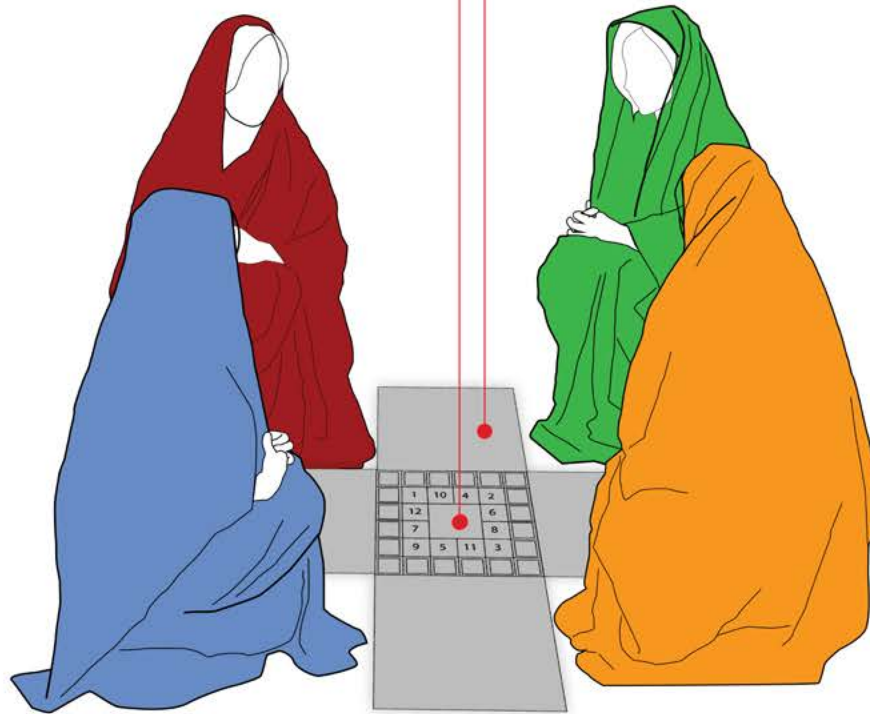
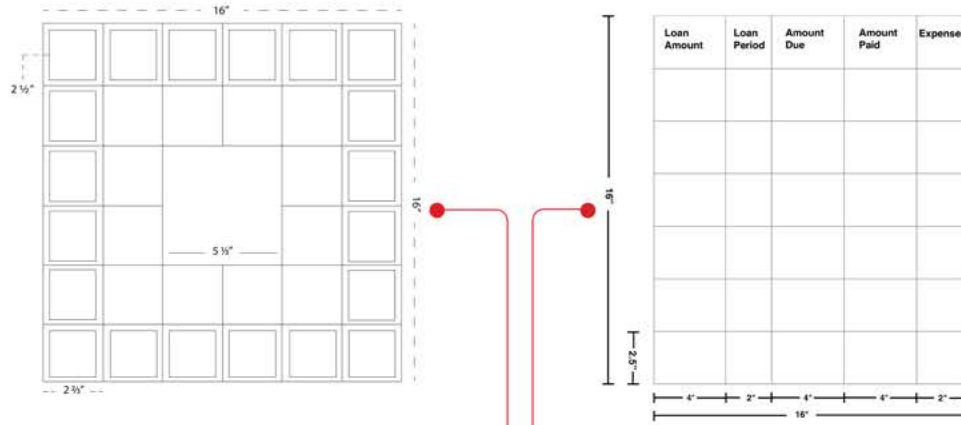


MORE LOANS = MORE INTEREST PAID = MORE PROFIT

Phone screen simulation speeds up the process

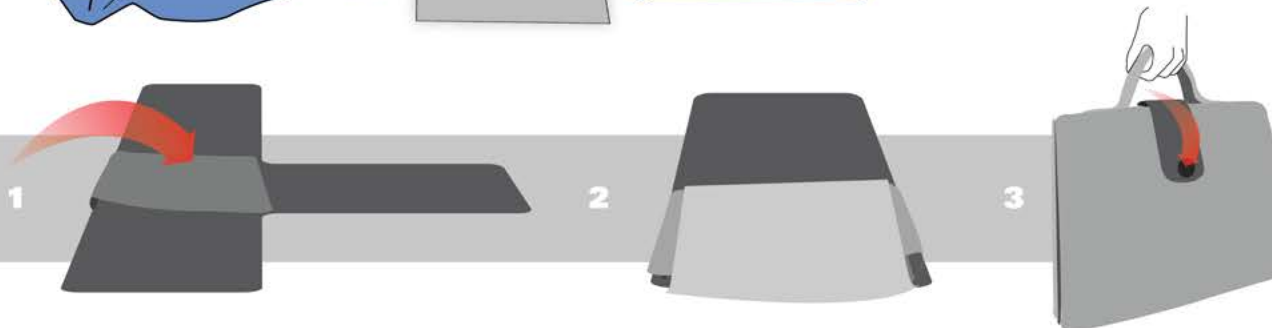
LAXMI EASY USE

The women gather around Laxmi to use it. The measurements are simple for easy manufacturing and it folds easy for use when it is taken home by a member of the group after each meeting.



USER FRIENDLY

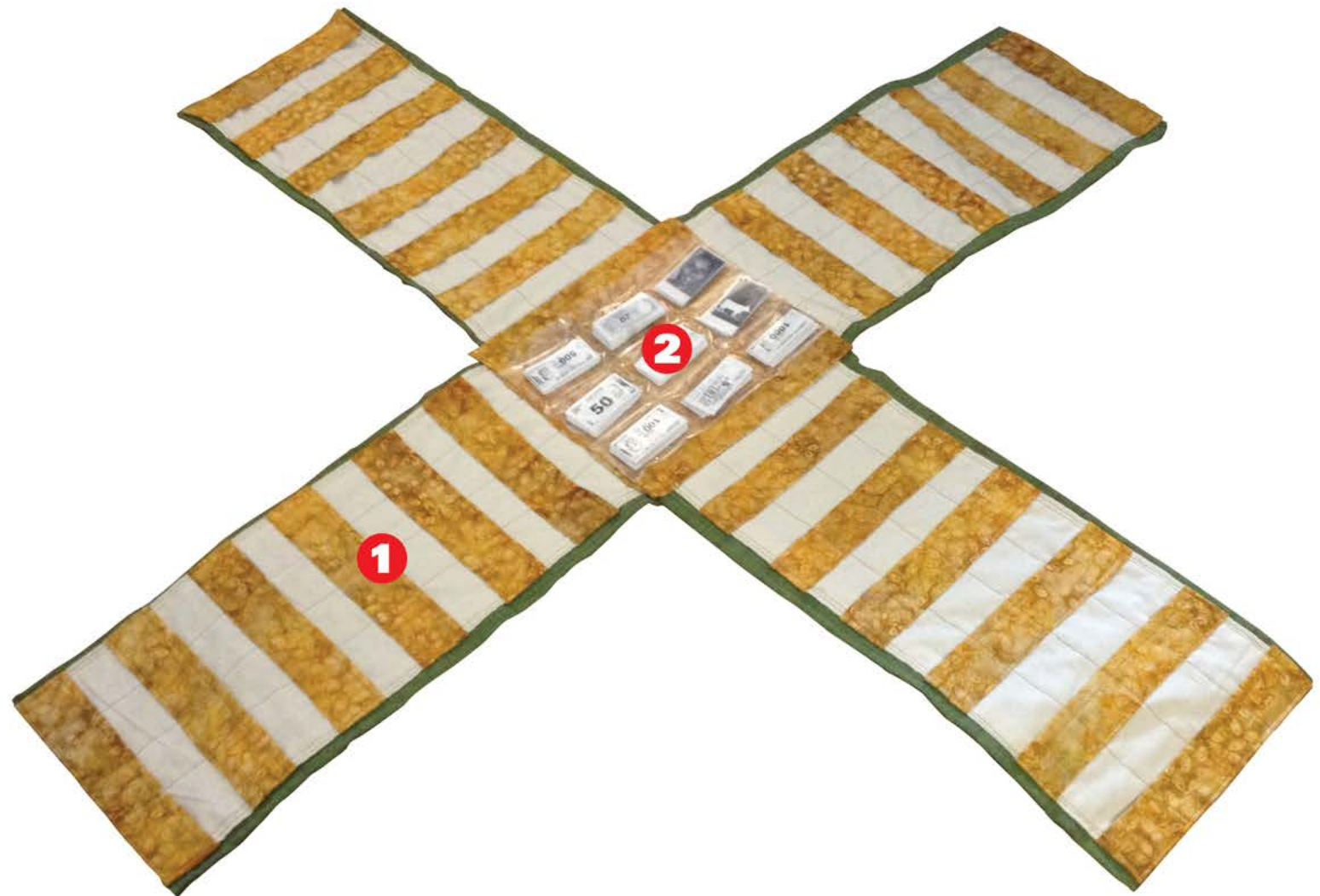
Folds for easy storage and transport. A flap on the back allows for locking and a handle is used for easy carrying.



FOLD AND GO

LAXMI FINAL FABRIC PROTOTYPE

This is the final Laxmi prototype. This prototype uses the same manufacturing process and materials available to the women using it in India.



MATERIALS

Made from local materials and manufacturing techniques,

1 Local textiles and colors indicate region and culture

2 "money," photos, and cards provided by NGO to get things started

LAXMI THE IMPACT

It is already part of a teaching program for promotion of Self Help Groups under the Ministry of Women and Child Development in Rajasthan India.



1.5 MILLION WOMEN WILL BE USING THE SYSTEM IN THE NEXT DECADE

THE REACTION

"The system is effective because it has a very short learning curve and its very transparent, even for women who cant read and write."

Uchav Sharma, Field training officer for Self Help Groups training since 1992

CHEERS!

THANKS FOR YOUR TIME.

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