Design Development Record

ID7 CAPSTONE

Boon Step.

a collection of research, paper sketches, digital whiteboards, digital sketches, photos of prototypes, CAD, and overall planning

DISCOVER PHASE

RHYS DUGGIN

7/2024

DIRECTION DEFINITION - INITIAL IDEATION

Inclusive camping products - make camping more accessible to elderly individuals or individuals impacted by mobility and physical limitations.

- Designed for people suffering from mobility and physical limitations.
- Elderly individuals face numerous barriers when participating in camping activities.
- No camping products or brand specifically designed for elderly individuals.
- Camping is good for mental health - especially important to elderly people and people impacted by disabilities.
- Design for accessibility.
- Ageing population, costs of living.
- Promoting accessibility and inclusivity in outdoor activities (camping).
- There is a need for camping equipment that is designed to accommodate individuals with physical and mobility challenges. This will make camping a more inclusive activity for everyone.
- Camping has been proven to have positive effects on mental health. Providing accessible camping products will enable more people to experience these benefits.

With an ageing population and increasing costs of living, there is possible demand for affordable, accessible outdoor recreational options that cater to older adults and those with limited mobility.

Identify the specific needs and challenges faced by elderly campers. Develop products that enhance their camping experience by addressing their challenges. The focus will be on creating user-friendly, ergonomic, and safe camping equipment tailored to the needs of older adults.

TUTOR FEEDBACK - ANTON

- FOCUS ON A MORE SPECIFIC DISABILITY
- WHAT TYPE OF CAMPING ARE THEY DOING?
  - TENTS?
  - CARAVANS?
  - GROUPS?

ACTIONS TO TAKE

- RESEARCH DISABILITIES IMPACTING ELDERLY PEOPLE
- RESEARCH WHAT SORT OF CAMPING THEY DO. STRUGGLE TO DO, WANT TO DO

1 in 6 (16%) Australian are 65 and over

CONTEXT IMAGES / INITIAL MOOD BOARD

↳ RV, SOCIALISING

↳ INDERPENDANCE

↳ HAPPY, CARE

↳ ADVENTURE, INDIPENDANCE

PRODUCT RESEARCH

- THE PRODUCTS THAT INCLUDE A STRUCTURE SEE COMPLICATED FOR IMPAIRED INDIVIDUALS

- MARKET OPPORTUNITY FOR BRAND AIMED AT ELDERLY CAMPING INDIVIDUALS

- ALL THESE PRODUCTS / BRANDS ARE NOT SPECIFICALLY DESIGNED

SOURCE

DIRECTION DEFINITION - INITIAL IDEATION

Disabilities impacting elderly individuals:

- Dementia
- Mobility Impairments:
- Arthritis: Causes joint pain and stiffness, making movement difficult.
- Osteoporosis: Leads to fragile bones, increasing the risk of fractures.
- Muscle Weakness: Reduces physical strength, making it hard to perform daily tasks.
- Sensory Impairments:
- Vision Loss: Conditions like cataracts, glaucoma, and macular degeneration can cause partial or complete loss of vision.
- Hearing Loss: Common in aging, leading to difficulties in communication and social isolation.
- Cognitive Impairments:
- Dementia: Includes Alzheimer's disease and other forms of dementia that affect memory, thinking, and behavior.
- Mild Cognitive Impairment (MCI): Less severe than dementia but still impacts memory and cognitive functions.
- Chronic Health Conditions:
- Cardiovascular Diseases: Such as heart disease and stroke, which can limit physical capabilities.
- Diabetes: Can lead to complications like neuropathy, affecting mobility and overall health.
- Mental Health Issues:
- Depression: Often underdiagnosed, it can significantly affect an elderly person's quality of life.
- Anxiety: Can also impact daily functioning and social interactions.
- Respiratory Problems:
- Chronic Obstructive Pulmonary Disease (COPD): Causes breathing difficulties and limits physical activity.
- Urinary and Bowel Incontinence:
- Can lead to social isolation and decreased independence.

↳ ALL IMPORTANT TO CONSIDER WHEN DESIGNING

INITIAL FOCUS AREAS (CONTEXT & PEOPLE)

- Focusing on elderly individuals who are impacted by mobility impairments who undertake recreational RV camping
- Focusing on elderly individuals who are impacted by mobility impairments who want to undertake camping
- A solution that addresses challenges faced by elderly individuals with mobility impairments who aspire to enjoy camping.

INITIAL PRODUCTS IDEAS

WOULD PEOPLE W/ MOBILITY IMPAIREMENTS EVEN USE TENTS? RV?

- Redesigning the caravan step to better suit elderly individuals with mobility impairments
- Tent designed for elderly individuals with mobility impairments
- Also can relate to tiny home

↳ INCREASING IN POPULARITY

CONTEXT - RV CAMPING

RV CAMPING

- GREY NOMADS
- INCREASING IN POPULARITY
- OLDER PEOPLE HAVE MORE DISPOSABLE INCOME
- MORE COMFORTABLE BUT STILL HAS CHALLENGES

↓

ESPECIALLY WITH MOBILITY IMPAIRMENTS

↓

DESIGN FOR DISABILITY

DIRECTION DEFINITION - FRAMING THE DESIGN CHALLENGE

3 GOOD HEALTH AND WELL-BEING

Safety / enhancing experience for entering / exiting recreational vehicles for elderly / individuals with mobility impairment.

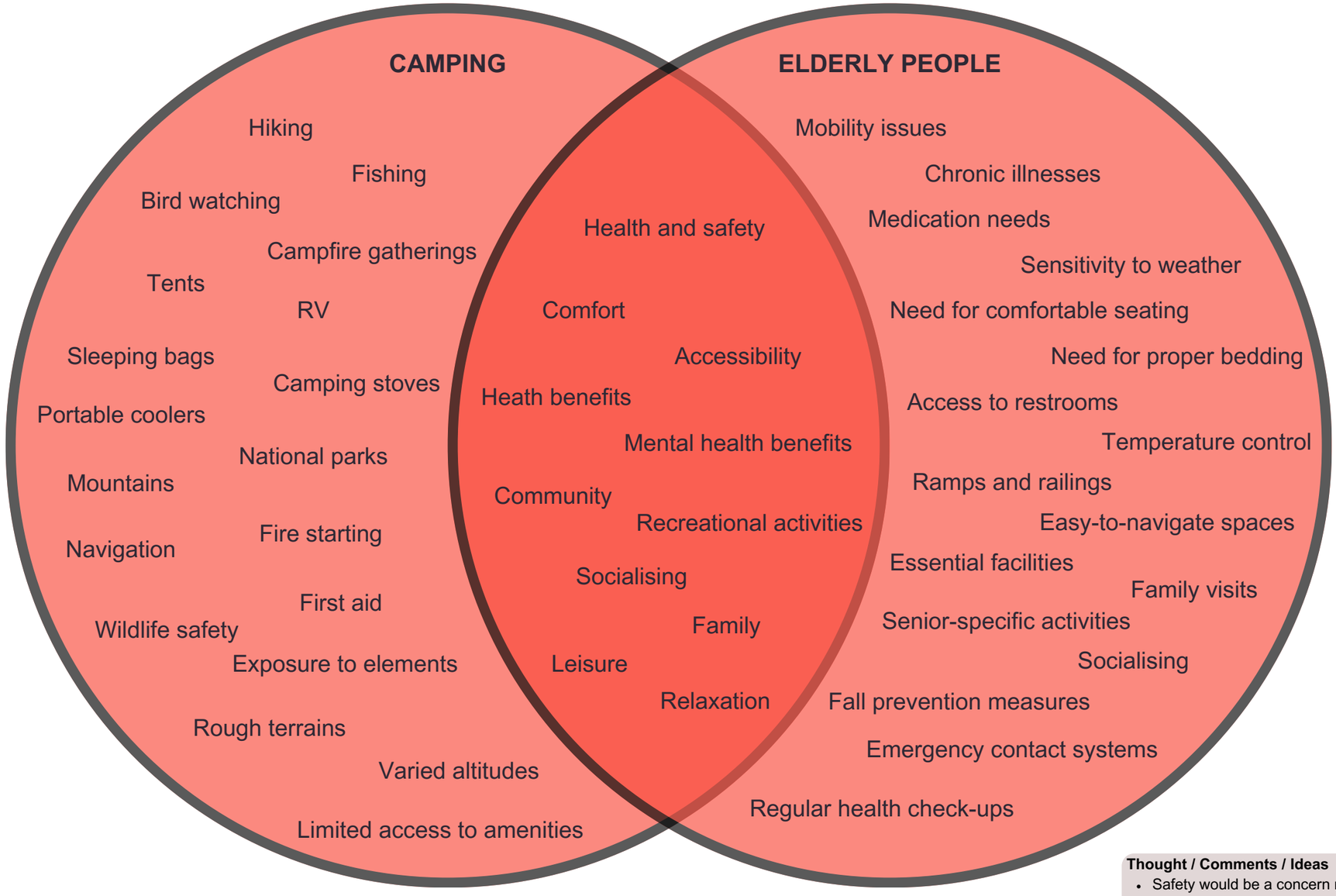
There have been reports and studies highlighting safety incidents involving elderly individuals falling out of RVs. These incidents can occur due to various factors, such as:

Lack of Stability: RV steps can be steep and unstable, making it difficult for elderly individuals with mobility issues to enter or exit safely.
Limited Handrails: Insufficient or poorly positioned handrails can contribute to falls.
Slippery Surfaces: Wet or slippery steps and floors can increase the risk of falls.
Health Conditions: Age-related health conditions such as impaired vision, balance issues, and muscle weakness can exacerbate the risk of falling.

RV (recreational vehicle), is a general term and can be used to describe the types of motorhomes, campervans, caravan and camper trailer style vehicles as a whole.

https://explorermotorhomes.com.au/campervan-motorhome-caravan-camper-trailer-whats-the-difference/#:~:text=RV%20(recreational%20vehicle)%2C%20is,%2C%20space%2C%20cost%20and%20amenities.

POEPLE & CONTEXT (VENN DIAGRAM)



* MANY BENEFITS TO CAMPING FOR ELDERLY INDIVIDUALS

↓

- HEALTH BENEFITS
- MENTA HEALTH
- SOCIALISING
- LEISURE
- RELAXATION
- FUN
- ADVENTURE

Thought / Comments / Ideas

- Safety would be a concern more individuals with mobility issues - not just elderly.
- Lots of these things are not only applicable to elderly individuals.
- Designing for elderly individuals could make the solution applicable to a much wider market.
- How long do the spend an the campsite with their RV vs doing activities?

Sources

RHYS DUGGIN

28/07/2024

PACT: POEPLE

LOOKING MORE BROADLY

- MOST NEED ASSISTANCE FROM SECOND PERSON

HAPPY

WALKER / HOPPER

BOTH HANDS REQUIRED

HOLDING ON TO PEER FOR ASSISTANCE

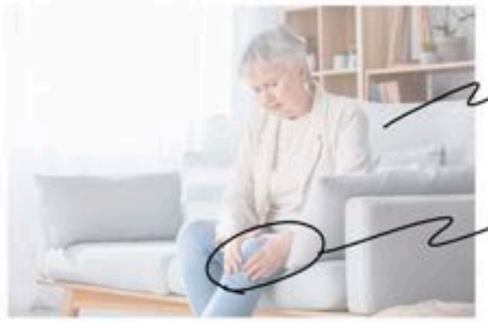
WALKING STICK

UNEVEN SURFACE

SECOND PERSON TO ASSIST

SECOND PERSON TO ASSIST

REQURIES LIFTING DEVICE TO GET INTO CAR / VAN



SITTING IS REQUIRED DUE TO PAIN

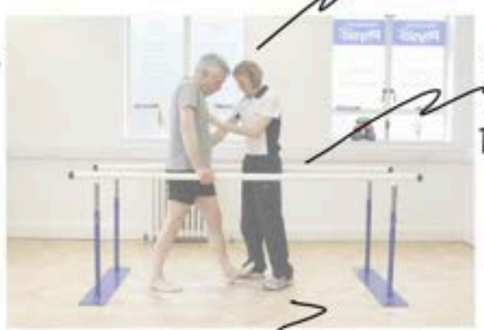
KNEE ISSUES

↳ IMPACTS MOBILITES

REQUIRES ASSISTANCE

WHEEL CHAIR

SPESIALIST



SECOND PERSON TO ASSIST

ASSISTANCE REQUIRED

SECOND PERSON TO ASSIST

MANY DIFFERENT TYPES OF MOBILITY ASSISTANCE DEVICES

- MOST PEOPLE IN THESE IMAGES REQUIRE ASSISTANCE FROM ANOTHER PERSON

↓

DUE TO MOBILITY IMPAIREMENTS

↓

MAKE RV ACCESSIBLE WITHOUT THE NEED FOR ASSISTANCE FROM ANOTHER PERSON

↓

TECHNOLOGY?

BUILD EMPATHY

PRODUCT RESEARCH

We need to see some more innovation and modern aesthetics in the RV industry.....

MOBILITY DEVICES FOR FOR RECREATIONAL ACTIVITIES

GENERIC SUPPORT DEVICE

REQUIRES ARM STRENGTH

WORKS W/ DOOR LATCHES OF CAR

DOES NOT HELP MUCH FOR LEG MOBILITY

- Designed for entering and exiting cars and SUVs.
- Affordable
- Simple
- May not feel sturdy/reliable

REMOTE OPPERATED

↳ POWERED → TECH

SMALL PLATFORM

↳ CONSTRUCTED FROM METAL

LOOK HEAVY / COMPLICATED TO SETUP

WALKING CANE & STAND ASSIST AID

WOULD BE HARD TO USE ON RV STEPS

↓

COULD CAUSE TRIPPING

↓

OPPOSITE AFFECTED

- Designed to assist with mobility.
- Slim
- Compact
- Affordable
- Simple
- May not feel sturdy / reliable

Product Benchmarking Plan:

- Research existing products on the market.
- Read reviews, descriptions, specs.
- Take note on what is said about them.
- Make a criteria to compare the products against each other,
- Make a matrix and compare the products.
- Find gaps in the market.

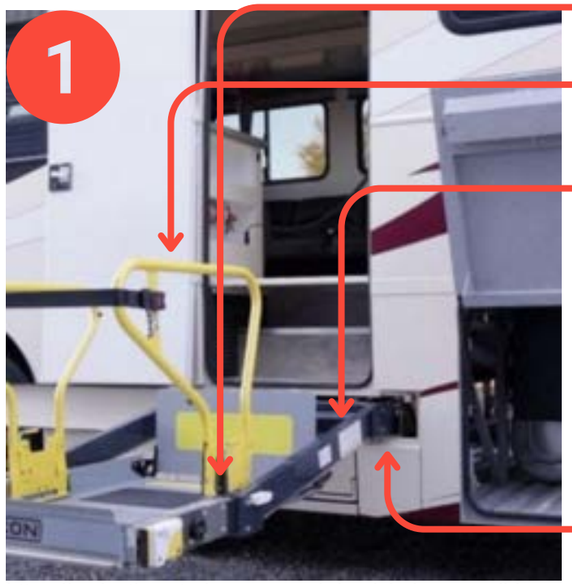
Unsteady on the stairs? Fitness tips for older people

Do you worry about your parents feeling unsteady on the stairs (especially when out and about on public transport)? There are fitness exercises they can do.

7 RV Safety Products for Seniors & RVers with Disabilities

Whether you're getting older or have a disability, these RV safety products can help make RV travel more accessible, comfortable, and...

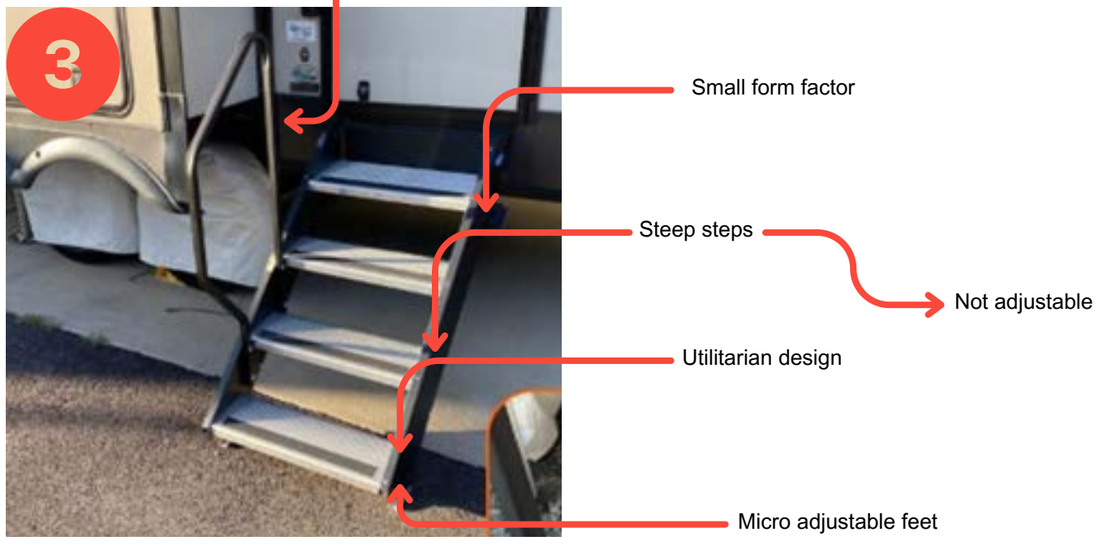
PRODUCT BENCHMARKING - RV STEP DEVICES



https://majesticmotorhomes.com/wheelchair-accessible-coach-motorhome/

STRENGTHS:
- Durable - Strong - Gives confidence to user.
- Can handle a whole wheelchair - large weight rating.
- Powered lift mechanism
- Form follows function approach.

WEAKNESSES:
- Built into the RV - RV is expensive and inaccessible.
- Aesthetics - Ugly - not subtle - stands out - highvis colours.
- Requires power - uses up Rv's power - could be critical when camping.
- Large footprint - takes up a lot of critical space.



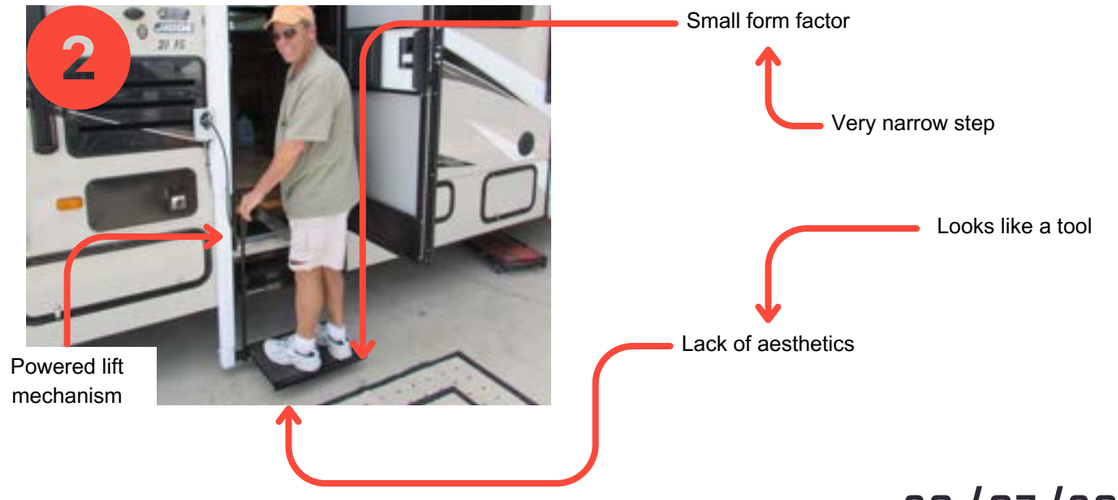
https://www.amazon.com.au/koxuyim-Handrail-Generation-Support-Entering/dp/B0BNMCBTFD

STRENGTHS:
- Simple design.
- Small in size.

WEAKNESSES:
- Looks utilitarian - aesthetics are not considered.
- Lack of adjustability.
- High and slightly narrow.
- Hard to fold away.

STRENGTHS:
- Simple to use - UX
- Small form factor
- Looks portable

WEAKNESSES:
- Very narrow and small for foot placement.
- No aesthetics.
- Does not fold away



PRODUCT BENCHMARKING - RV STEP DEVICES

https://www.mesa-electropedic.com/Mesa-Vehicle-Lifts.html

Stands out

Looks difficult to set up and dissassemble

Very bulky design

Large base plate

Designed for wheelchair users

STRENGTHS:
- Can be used for wheelchair users.
- Deep step/large base plate.
- Additional hand rails for added stability.

WEAKNESSES:
- Complicated design - requires drilling into RV - permanent.
- Not very aesthetic - looks like an assistive device - no consideration of aesthetic principles.
- Requires 2 people to operate.
- Does not fold away.
- Requires power to opperate.
- Very expensive

STRENGTHS:
- Retro fittable to most RVs
- Allows the user to be seated if they cant stand.
- Semi affordable

WEAKNESSES:
- Only suitable for seating
- Requires 2 users
- Basic aesthetics - just metal tubing.
-

Remote opperation

Requires 2 people to opperate

Long lasting

Heavy

Metal constuction

Grab handles for added stability

STRENGTHS:
- Simple to use - UX
- Small form factor
- Looks portable
- Most affordable option

WEAKNESSES:
- Very narrow and small for foot placement.
- No aesthetics.
- Does not fold away
- Requires 2 people
- Heavy

https://rvlifts.com/installations/winnebago-seat-lift-01/

Cant have door closed

Motorised opperation

Requires 2 people

Retro fittable to all RVs

PRODUCT RESEARCH

Product benchmarking plan:

1. Research existing products on the market. Read reviews, descriptions, specs.
2. Take note on what is said about them.
3. Make a criteria to compare the products against each other.
4. Make a matrix and compare the products. Find gaps in the market.

1. Identify Benchmark Products
Competitors' Products: Select the top products from your direct competitors.
Industry Leaders: Include products from industry leaders, even if they are not direct competitors.
Innovative Products: Look for products that are known for their innovation and unique features.
2. Set Evaluation Criteria
Performance: Assess functionality, efficiency, and reliability.
Aesthetics: Consider design, style, and overall visual appeal.
Usability: Evaluate user interface, user experience, and ergonomics.
Materials and Manufacturing: Look at the quality, sustainability, and cost of materials and manufacturing processes.
Cost: Compare pricing and cost-efficiency.
Customer Feedback: Review user ratings, reviews, and testimonials.
3. Gather Data
Product Reviews: Use online reviews, customer feedback, and expert opinions.
Specifications and Features: Compile detailed product specs and feature lists.
Hands-On Evaluation: If possible, purchase or test the products yourself.
Market Analysis: Study market trends and sales data.
4. Analyze Data
SWOT Analysis: Identify strengths, weaknesses, opportunities, and threats of each product.
Competitive Analysis: Determine how each product stands out and where it falls short.
Feature Comparison: Create a feature comparison matrix to visualize differences and similarities.
5. Generate Insights
Identify Gaps: Look for unmet needs or gaps in the market.
Highlight Best Practices: Note the best practices from other products that you can adopt or adapt.
Innovation Opportunities: Identify opportunities for innovation and unique value propositions.
6. Implement Findings
Design Improvements: Apply insights to improve your product's design and features.
Differentiation: Focus on aspects that can set your product apart from the competition.
Continuous Improvement: Use benchmarking as an ongoing process to keep your product competitive.
7. Monitor and Review
Track Performance: Monitor your product's performance in the market against competitors.
Gather Feedback: Continuously gather user feedback and iterate on design improvements.
Stay Updated: Keep up with industry trends, new technologies, and emerging competitors.

Product Benchmarking Table

	Product:
Performance: functionality, efficiency, and reliability.	
Aesthetics: design, style, and overall visual appeal.	
Usability: Evaluate user interface, user experience, and ergonomics	
Materials and Manufacturing: quality, sustainability, and cost of materials and manufacturing processes	
Cost: Compare pricing and cost-efficiency.	
Customer Feedback: Review user ratings, reviews, and testimonials.	

PRODUCT BENCHMARKING - ASSISTIVE DEVICES FOR RV'S

Top-20 Most-Searched: Australian-Made

Top 20 Searched - Australian-Made

Q By Q search by Category

	Brand	2023 Q3	2023 Q4	2024 Q1	2024 Q2
1.	Jayco	36.5%	38.5%	38.3%	36.9%
2.	Avan	4.4%	4.3%	4.2%	4.2%
3.	New Age Cara...	4.3%	3.8%	3.6%	3.6%
4.	Zone RV	2.7%	2.4%	3.0%	2.8%
5.	Lotus Caravans	2.7%	2.6%	2.5%	2.7%
6.	Winnebago	2.9%	2.8%	2.8%	2.7%
7.	Highline Carav...	0.3%	0.3%	0.3%	2.5%
8.	Avida	2.5%	2.3%	2.2%	2.3%
9.	Crusader Cara...	2.3%	2.3%	2.1%	2.3%
10.	JB Caravans	2.1%	2.0%	1.9%	1.9%
11.	Patriot Campe...	2.5%	2.0%	2.1%	1.9%
12.	Titanium Cara...	1.6%	1.7%	1.8%	1.9%
13.	Cub Campers	1.6%	1.7%	1.7%	1.7%
14.	Australian Off ...	1.8%	1.8%	1.4%	1.4%
15.	Windsor RVs	1.3%	1.4%	1.4%	1.3%
16.	Coromal Cara...	1.0%	1.1%	1.2%	1.3%
17.	Essential Cara...	1.3%	1.2%	1.2%	1.2%
18.	Track Trailer	1.5%	1.4%	1.3%	1.1%
19.	Nova	1.2%	1.1%	1.0%	1.1%
20.	Urban Caravans	0.8%	0.7%	1.2%	1.1%
	Grand total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

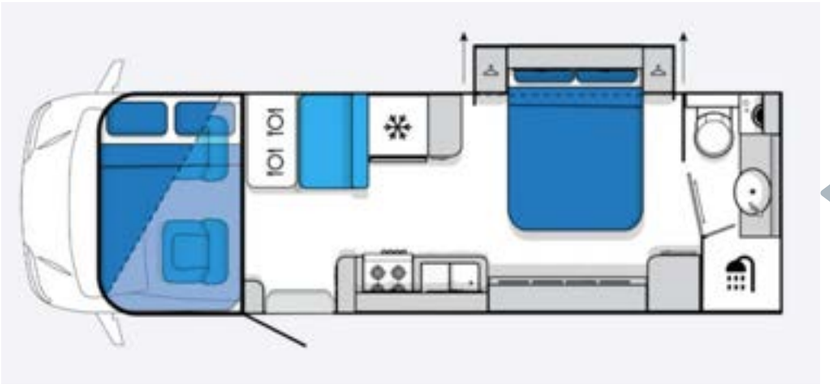
Australia's Most-Searched Caravan Brands

Top 20 Searched - Caravan Brand

Q By Q search by Category

	Brand	2023 Q3	2023 Q4	2024 Q1	2024 Q2
1.	Jayco	27.1%	28.5%	28.6%	27.5%
2.	Market Direct (MDC)	3.8%	4.0%	4.0%	4.0%
3.	Avan	3.3%	3.2%	3.1%	3.1%
4.	Ezytrail	2.6%	2.8%	2.7%	2.8%
5.	Austrack	2.4%	2.7%	2.5%	2.8%
6.	New Age Caravans	3.2%	2.8%	2.7%	2.7%
7.	Zone RV	2.0%	1.8%	2.2%	2.1%
8.	Lotus Caravans	2.0%	1.9%	1.9%	2.0%
9.	Winnebago	2.2%	2.1%	2.1%	2.0%
10.	Lifestyle Campers	2.2%	2.0%	2.0%	2.0%
11.	Opus Camper	2.0%	2.2%	2.3%	2.0%
12.	Snowy River Caravans	2.2%	2.0%	2.0%	1.9%
13.	Highline Caravans	0.2%	0.2%	0.2%	1.8%
14.	Avida	1.9%	1.7%	1.6%	1.7%
15.	Crusader Caravans	1.7%	1.7%	1.6%	1.7%
16.	JB Caravans	1.5%	1.5%	1.4%	1.4%
17.	Patriot Campers	1.9%	1.5%	1.6%	1.4%
18.	Titanium Caravans	1.2%	1.3%	1.4%	1.4%
19.	Mars	1.2%	1.6%	1.5%	1.3%
20.	Cub Campers	1.2%	1.3%	1.3%	1.2%
	Grand total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Focusing on the Australian market, these are some important statistics for product benchmarking



JAYCO CONQUEST

- Narrow bathroom - but has one inbuilt.
- 2nd bed is high off the ground requiring a ladder.
- Narrow door way.
- Has all the amenities a couple would need.

PRODUCT BENCHMARKING - ASSISTIVE DEVICES FOR RV'S

	Product: MOTOSTEP MS600H **https://www.motorstep.net/ms600h-ms800h** 	**Product: Amazon Stepping Stool** **https://www.amazon.co.uk/Stepping-Medical-Handrail-Elderly-Handicap/dp/B0CZ8QNFLC?th=1** 	**Product:** **https://www.torklift.com.au/rv/glowstep-revolution-uprising** 
Performance: functionality, efficiency, and reliability.	• Indoor and outdoor use. • Motorised for lift individual up single steps. • Comes with extented warranty - confident in quality. • Requires power - something to think about when camping.	• Simple functionality / design. • Manual operation - no electronic components. • Lightweight. • Antislip hand rails for additional assistance, non slip feet, textured padding. • Height adjustable	• Interesting flexible design. • Could be difficult for elderly to setup. • Only fits RV with no stepwell - really limits the market.
Aesthetics: design, style, and overall visual appeal.	• Form follows function approach. • Not aesthetically pleasing. • Not very subtle. • looks like a tool. • CNF not really thought about.	• Looks very bland and medical like. • Does not suit the outdoor/camping aesthetic. • Does not look visually appealing. • does not look robust/strong.	• Industrial looking - not aesthetic. • Looks like a tool. • Very large footprint.
Usability: Evaluate user interface, user experience, and ergonomics	• Looks simple enough to use - simple up and down movement. • Made for a single step.	• Looks simple enough to use - simple up and down movement. • Made for a single step.	• Looks complicated to setup. • Difficult to pack away. • Tripping hazard. • Fidgety.
Materials and Manufacturing: quality, sustainability, and cost of materials and manufacturing processes	• All metal construction - long lasting. • Higher material cost associated with using metals - needed due to strength and reliability. • Welding, construction, CNC, punch/bending, assembly. • No recognition of sustainable design	• Mainly utilises fasteners over welding. • Cheap manufacturings costs • Mass products • No recognition of sustainable design	• Sheet metal - strong and cheap. • Not the most sustainable materials but they are long lasting. • Cost associated with this would be long materials costs. Higher labour costs.
Cost: Compare pricing and cost-efficiency.	• Very expensive (around $5000)	• Cost effective compared to electronic options (around $450) •	• Looks simple enough to use - simple up and down movement. • Made for a single step.
Customer Feedback: Review user ratings, reviews, and testimonials.	• Robust, waterproof, likes that it comes assembled, easy to move around (secondary user). • Does exactly what it says. • Eldelry mother would not be able to to go to all caravan sites without it. • Screw assembly issues.	• Takes too long to put together - to many pieces and fixings. • Bad assembly instructions. • Poor usability. • Work okay once assembled.	• Looks simple enough to use - simple up and down movement. • Made for a single step.

PRODUCT BENCHMARKING - JAYCO RV'S

	Product: Jayco Swift Camper Trailer https://www.jayco.com.au/range/camper-trailers/swift-campertrailer 	**Product: Jayco Conquest Motorhome** https://www.jayco.com.au/range/jayco-motorhomes/jayco-conquest 	**Product: Jayco Starcraft Caravan** **https://www.jayco.com.au/range/caravans/jayco-starcraft-caravan** 
Performance: functionality, efficiency, and reliability.	• Lack of advanced amenities • Compact size - good and bad - limits features like full size bathroom and large storage areas. • Pop-up design, while space-saving, may lead to concerns about durability and insulation in extreme weather conditions. • Pop-up mechanism or the folding joints may wear out over time. • Jayco's reputation for reliability is generally strong. • Designed for on road performance. • High off the ground.	• Designed to be a fully self-contained motorhome. • Includes a kitchen, bathroom, sleeping areas, and entertainment options. • Layout might feel cramped - especially with multiple people. • Fixed layout may limit flexibility. • Less fuel-efficient compared to smaller campervans or trailers. • Regular maintenance is essential. • High off the ground.	• Designed for long and short trips. • Not as adaptable compared to other caravans - fixed layout • Lots of storage but not a lot of flexible space. • Heavy for small vehicles. • Conventional materials and construction techniques might lead to wear over time. • High off the ground
Aesthetics: design, style, and overall visual appeal.	• Utilitarian - lacks innovation - conservative • Dated design aesthetics. • Relying on conventional aesthetics. • Cramped and lack the modern touches in the interior. • May not stand out in the market due to styling.	• Utilitarian - conservative. • Could benefit from a redesign/refresh for a more modern approach. • Practical but generic. • Interior seems dated. • Incorporating more modern materials like sustainable materials and finishes. • Lack of smart storage solutions. • Lacks wow factor. • Looks like a budget RV - white and plastic finishes.	• Conservative like other RV's but black external details looks sporty and more modern. • Curved edge on the side adds to the modern RV aesthetics. • Interior looks uninspiring and conventional. • Needs more modern materials and aesthetics on the interior. • Looks like every other caravan. • Lacks wow factor.
Usability: Evaluate user interface, user experience, and ergonomics	• Pop-up mechanism - has its purpose although could be more simple - difficult for elderly? • Require multiple steps or tools to setup. • The setup process may not be as quick or easy for older users or those with mobility issues. • Interior may feel restricted due to space. • Interior may benefit for a more HCD approach. • The lack of adjustable or flexible features might limit user satisfaction. • Lack of advanced technology. • Very tight space. • Very small grab handling for entering on the right side.	• Usually a learning curve for motorhomes. • layout is functional but may feel constrained. • Fixed furniture and storage arrangements limit flexibility. • More adjustable seating and living options could be beneficial - HCD considerations. • Lack of advanced technology. • No grab handle	• Lack of advanced technology. • Uses basic control system like other RVs on the market. • UX could be improved by adding more flexible or modular elements. • Tight spaces. • Designed for comfort - however, might feel cramped for larger people. • More adjustable features would enhance the design. • Very small grab handle on the left side for entering.
Materials and Manufacturing: quality, sustainability, and cost of materials and manufacturing processes	• Clear emphasis on cost-saving rather than premium quality - due to the price and market gap it is trying to fill. • Jayco's sustainability efforts seem minimal in this model. • Focus on keeping costs down is evident.	• Noticeable emphasis on traditional materials like wood, metal and plastic - opportunity to explore new materials - sustainability. • More eco-friendly materials, such as bamboo or recycled plastics.	• Uses traditional caravan materials - wood, metal, plastics. • Lightweight composites or advanced polymers, could improve both the quality and performance. • Not utilising sustainable materials and manufacturing processes. • Longer lasting materials would be beneficial and more sustainable.
Cost: Compare pricing and cost-efficiency.	• $22,000 - more affordable compared to others on the market.	• $140,000 - aiming for value and premium positioning.	• The Starcraft is positioned as a mid-range option. • $65,000
Customer Feedback: Review user ratings, reviews, and testimonials.	• Okay for the money - clearly bought for affordability. • Recalls on roof mechanism. • Numerous quality concerns - finishes are poor. • Door issues -quality. • Falling apart after short period of time - quality.	• Quality issues. • Feature are difficult to use - drop down bed. • Reported breakdowns. • Water ingress. • Many repairs needed.	• Tows very well. • People like the looks. • Quality issues - things moving out of place when going over bumpy roads - things falling off the van - poor assembly - leak issues. • Bad service from the company (Jayco).

RHYS DUGGIN

PRODUCT BENCHMARKING

	Product: Camco Fold Away Grab Handle **https://www.justkampers.com.au/camco-fold-away-grab-handle-black.html** 	**Product: Camco Fold Away Grab Handle** **https://www.caravansplus.com.au/camco-fold-away-grab-handle-61cm-white42176-p-16818.html?srsltid=AfmBOoqqoLCEK67lAtl2yZs-5niao6bE1yOcVJob3LTdzDdgBe6KIRSL** 	**Product: ESUDNT White Grab Handle** **https://www.amazon.com.au/ESUDNT-Handles-Automotive-Thickened-Aluminum/dp/B0B68G6J9B?th=1** 
Performance: functionality, efficiency, and reliability.	• Claimed easy installation. • Can go on either side of RV door. • Fold aways when not in use. • Aluminium construction with UV resistant plastic brackets. • Weather resistant. • Claimed ergonomic grip. • Australian made. • Requires drilling into RV.	• Claims to make entering and exiting RV safer and easier. • can go on either side of RV. • Requires fixings for installation - might be difficult for elderly. • Comes with warranty. • Requires drilling into RV.	• Small - made to be replacement style handles for RVs. • Light weight design. • Claimed to be sturdy and durable. • Pull user up the stairs using arm strength. • Requires drilling into RV. • More of a universal handle, not just made for RV's
Aesthetics: design, style, and overall visual appeal.	• Stands out on the RV. • Looks like an aftermarket modification. • Does not have a lot of visual appeal although looks like it will do the job. • Lots of hardware for installations - design could be complicated for elderly. • Lots of companies with the same design.	• White and black colour way is simple and universal. • Does stand out - looks like an aftermarket part. • Requires lots of hardware.	• Silver and black colour way - suits most RV designs - conservative. • Does not look supportive / reassuring for the user. • Does not standout on the RV. • Looks OEM compared to other options. • Does not look like an assistive device.
Usability: Evaluate user interface, user experience, and ergonomics	• Simple to use although installation could be difficult. • Claimed ergonomics from the company. • Soft padded handle on part of it for additional comfort. • Tools required for installation.	• Claimed ergonomic design. • Sturdy grip. • Secure grip. • Tools required for installation.	• Due to the size, the handle is hard to reach from the bottom of the stairs. • Only can be used at the end of the stairs. • Not much HCD principles thought about in this design. • Looks like it has been designed for cost efficiency. • Thicker handle for additional comfort.
Materials and Manufacturing: quality, sustainability, and cost of materials and manufacturing processes	• Made from aluminium. • Corrosion resistant. • Made in Australia. • Black plastic parts that may fade and weaken over time. • Manufactured using metal tube bending and painting. • Long lasting metals.	• Aluminium construction • UV resistant plastic brackets	• Industrial grade aluminum alloy - corrosion resistant. • Industrial grade ABS plastic. •
Cost: Compare pricing and cost-efficiency.	• $87 each - affordable.	• $91 each - affordable	• $52 for a 2 pack - very affordable.
Customer Feedback: Review user ratings, reviews, and testimonials.	• *"good for elderly people'* • *"great install"* • *"material does not seem very strong"* • *"confusing installation"*	• *"Makes getting in and out of the caravan much easier and safer"* • *"feel solid on the van"*	• "After just a few days the handle pulled straight through the screw hole and busted up the attachment point" • "Feels cheap". • "It is very flimsy due too the ends being made of plastic comes with very tiny screws" • "I drilled out a little for bigger fasteners and used washers" • "Cheap plastic"

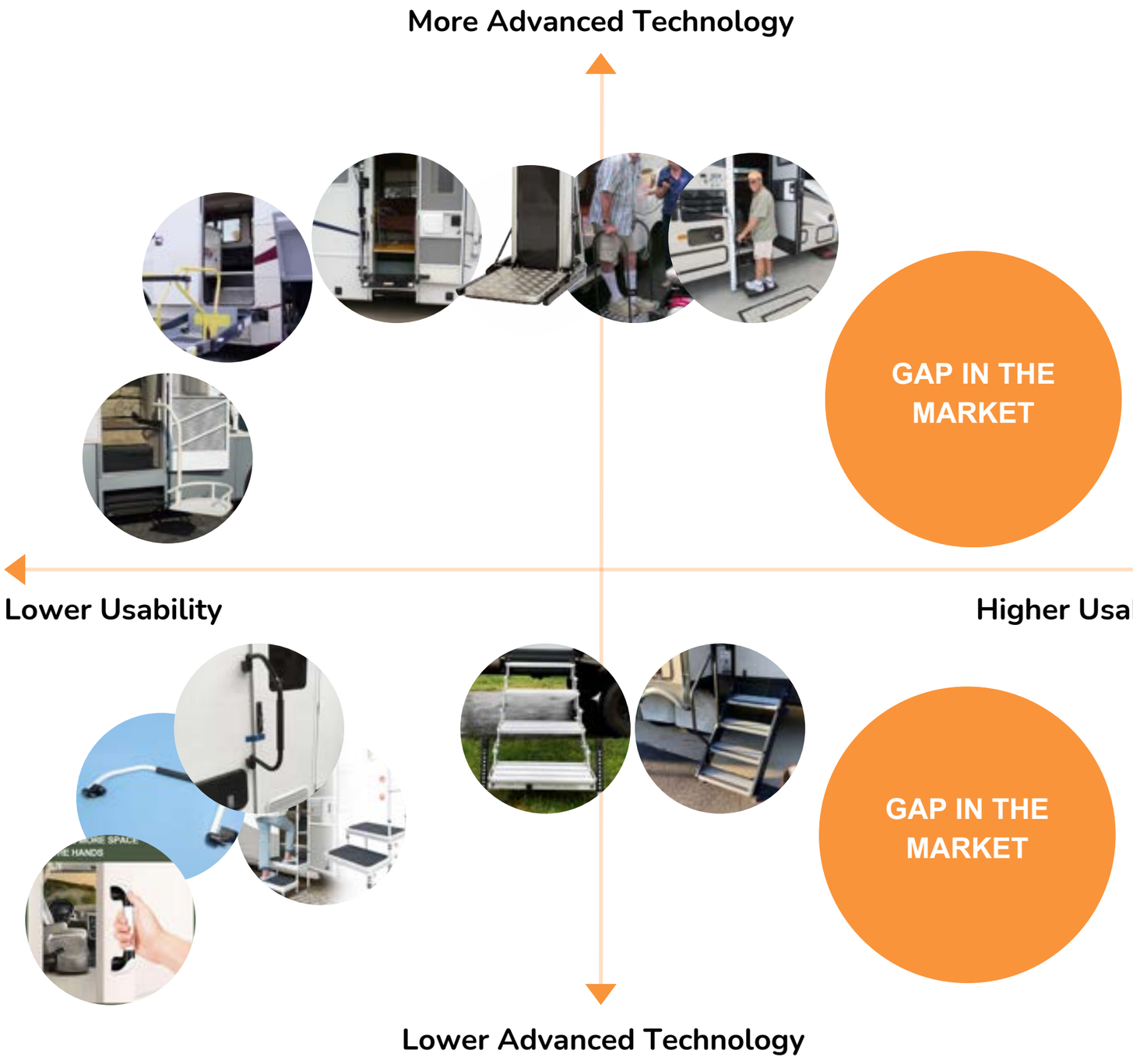
RHYS DUGGIN

01/08/2024

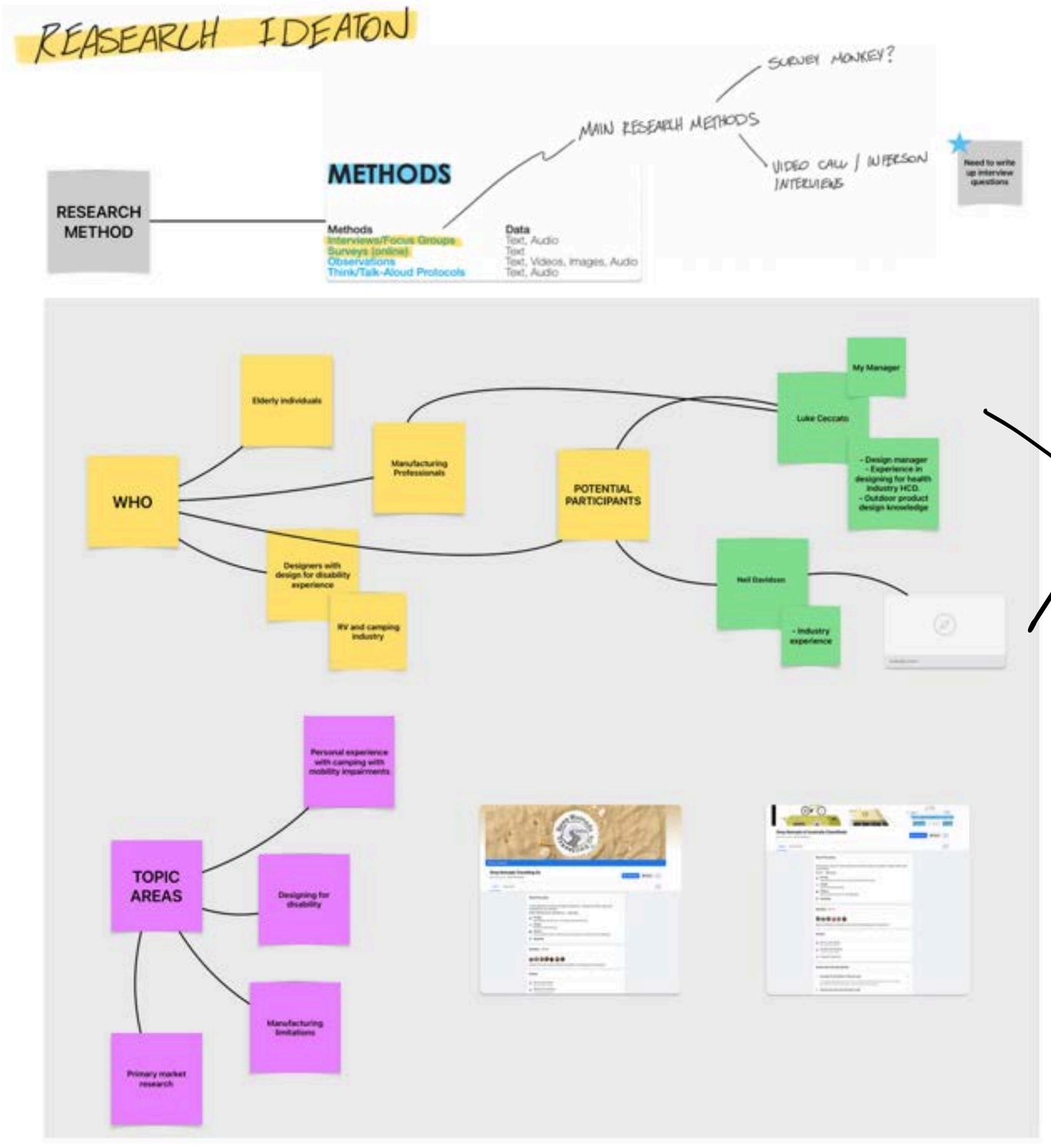
PRODUCT RESEARCH

PRODUCT RESEARCH

PRODUCT RESEARCH



RESEARCH IDEATION



USE THESE CONTACTS LATER ON IN THE DESIGN PROCESS

↳ FOCUS ON USERS

↳ PRIMARY AND SECONDARY

NOTES

Notes from Tutor (Raf):

- Research about why the users are getting in and out of the RV - can find something novel.
- Benchmark whole RV - the industry leading RV's on the market.
- The current benchmarking I am undertaking now is good but also think more broadly.
- Grey nomad groups for surveying?
- Industry experts - Caravan Industry, design for disability, elderly care? - CLOSER TO THE END OF THE DESIGN PROCESS.
- Focus on end users for the fist half of the design process.

Focus on these user groups for initial research

Primary users	Secondary users	Tertiary users
(those who directly interact with the technology)	*(those who someway benefit from the technology; use it via an intermediary; may have an influence about the primary users using/not using it)*	*(those who are affected by the technology use and decide its purchase/implementation)*
Patients, clinicians	Caregivers, designers, developers, technicians	Healthcare organizations, companies that provide funds for the technology
Example: A diabetes patient uses a smart-phone app everyday to remind of insulin injection and to register glucose values; the doctor also uses the app to monitor the patient at a distance	Example: Designers and developers use the app to test it and improve its functions; the caregivers help the patient to have the access to the device necessary to its use	Example: A pharmaceutical company funds the smart-phone app development; the hospital presents it to the patients and encourages its use

Primary Users:

- Elderly Individuals who participates in recreational vehicle camping

Secondary Users:

- Anyone that participates in participate in recreational vehicle camping .

Interview later on in the design process

ACTIONS TO TAKE

- Research most people RV's sold to the user group.
- Research the layouts of these RV's - find what is making people go in and out of the RV.
- Keep benchmarking products - Include RV's as a whole - RV accessories that my help people not go in and out of the RV's so much.

RESEARCH GROUPS?

Primary Users:

- Grey nomad facebook groups - Surveys
- Interviews with elderly campers
- Interview elderly people who do not camp - find out why?
- **Understand their direct experiences, challenges, and preferences.**

Secondary Users:

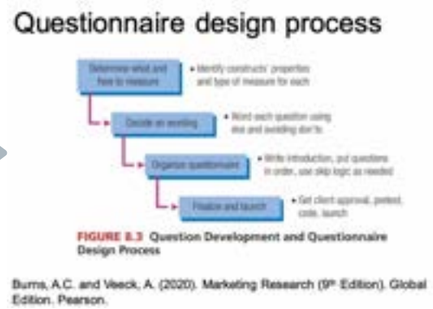
- Anyone that participates in recreational vehicle camping - survey
- Interview anyone that participates in RV camping to see what makes them enter and exit RV's
- **Understand their direct experiences, challenges, and preferences.**

Tertiary Users:

- Camping and Outdoor Activity Organisations
- Healthcare professionals and occupational therapists.
- Camping and outdoor activity organisations, retailers of camping equipment and accessories
- **Understand the challenges and needs of those assisting elderly campers.**

SURVEY IDEATION

SURVEY OBJECTIVES



This project aims to explore how safety and experience can be enhanced for elderly people participating in recreational vehicle camping. More specifically, focusing on entering and exiting recreational vehicles while possibly being affected by minor or major mobility impairments.

- Survey designed for target audience - elderly individuals that undertake in RV camping

- To Understand Demographics of the Target Audience: Determine the age range, gender, and presence of mobility impairments among elderly campers to tailor design solutions that meet their specific needs.
- To Assess Camping Habits and Experience: Gather data on the frequency of RV camping, the types of recreational vehicles used, and the duration of camping experience to understand usage patterns and preferences.
- To Identify Mobility and Safety Challenges: Measure the difficulty of entering and exiting RVs/camper trailers and identify specific challenges faced, such as steep steps, lack of handrails, slippery surfaces, and height differences.
- To Evaluate Incidents and Safety Concerns: Collect information on the occurrence of falls or near-fall incidents to understand the severity and frequency of safety issues faced by elderly campers with mobility impairments.
- To Determine Preferences for Safety Features: Identify which safety features (e.g., non-slip steps, additional handrails, adjustable steps, better lighting, wider doorways) are considered most helpful and assess their perceived importance.
- To Understand the Use and Challenges of Mobility Aids: Determine the use of mobility aids (e.g., cane, walker, wheelchair) and the challenges faced when using these aids in and around RVs/camper trailers to design more accessible solutions.

How will I reach participants?

- linkedIn
- Instagram
- Facebook Groups
- QR Code - shopping centres

QR CODE FOR SURVEY

- To Understand Demographics of the Target Audience
- To Assess Camping Habits and Experience
- To Identify Mobility and Safety Challenges
- To Evaluate Incidents and Safety Concerns
- To Determine Preferences for Safety Features
- To Understand the Use and Challenges of Mobility Aids

SURVEY QUESTION DESIGN

SURVEY FOR PRIMARY USERS

- Using a mix of qualitative and quantitative questions.
- Has descriptive questions with in-depth answers.

1. Age Range:
   - Below 60
   - 60-65
   - 66-70
   - 71-75
   - 76-80
   - 81+
2. Gender:
   - Male
   - Female
   - Other
   - Prefer not to say
3. Do you have any mobility impairments?
   - Yes (Please specify)
   - No
4. How often do you go RV camping?
   - Frequently (once a month or more)
   - Occasionally (a few times a year)
   - Rarely (once a year or less)
   - Never
5. What type of recreational vehicle do you use?
   - RV
   - Camper trailer
   - Van
   - Other (please specify)
6. How long have you been RV camping for?
   - Less than 1 year
   - 1-5 years
   - 6-10 years
   - 10+ years
7. What would be a major reason to sell your RV in the next 5-10 years?
8. What are the main reasons you enter and exit the RV? (for example: to go to the bathroom)
9. On a scale of 1-5, how difficult do you find entering and exiting your RV/camper trailer?
   - 1 (Very Easy)
   - 2
   - 3 (Neutral)
   - 4
   - 5 (Very Difficult)
10. What specific challenges do you face when entering or exiting your RV/camper trailer? (Select all that apply)
    - Steps are too steep
    - Lack of handrails
    - Slippery surfaces
    - Height of the step from the ground
    - Other (please specify)
    - None
11. Have you ever experienced a fall or near-fall incident while entering or exiting your RV/camper trailer?
    - Yes
    - No
12. What features would you find most helpful for improving safety when entering and exiting your RV/camper trailer? (Select all that apply)
    - Non-slip steps
    - Additional handrails
    - Adjustable steps
    - Better lighting
    - Wider doorways
    - Other (please specify)
13. How important is it to you to have these safety features in your RV/camper trailer?
    - Very Important
    - Important
    - Neutral
    - Not Important
    - Not Important at All
14. Do you use any mobility aids (e.g., cane, walker, wheelchair) when camping?
    - Yes
    - No
15. If yes, what challenges do you face using these aids in and around your RV/camper trailer?
16. Do you have any additional comments or suggestions on how to enhance the camping experience and safety for elderly individuals?
17. Would you be willing to participate in a follow-up interview or test new product designs?
    - Yes (Please provide your contact information)
    - No

- Use thematic analysis to analyse the qualitative data.

Different survey for secondary and tertiary users?

https://docs.google.com/forms/d/1UcyWtJet38TAsAWzsfSHir0wRbGheMZwuuaRVh6Nsl4/edit

Questions for Raf:

- Do the survey participants need to sign the consent form or is that assumed when they submit the survey?
- Can I attach the survey participant information at the start of the survey?
- How many people shoudl we be interviewing?

In-depth Interview

ACTIONS TO TAKE

- Get feedback from tutor (Raf).
- Create survey in survey tool.
- Send to user group - Facebook pages - Grey Nomads.

RHYS DUGGIN

07/08/2024

SURVEY DESIGN

This project aims to explore how safety and experience can be enhanced for elderly people participating in recreational vehicle camping. More specifically, focusing on entering and exiting recreational vehicles while possibly being affected by minor or major mobility impairments.

Aesthetic choices for survey

Older people can be drawn to soft pastels but they may not have the vitality of hue needed to stimulate the mind and mood. Eyesight problems can also impair how the colour is seen and what is seen. Softer shades of reds and oranges are warming and can help with circulation and energy levels. 25 Aug 2015

User Experience Stack Exchange
https://ux.stackexchange.com › questions › studies-on-c...

Studies on color for the elderly - UX Stack Exchange

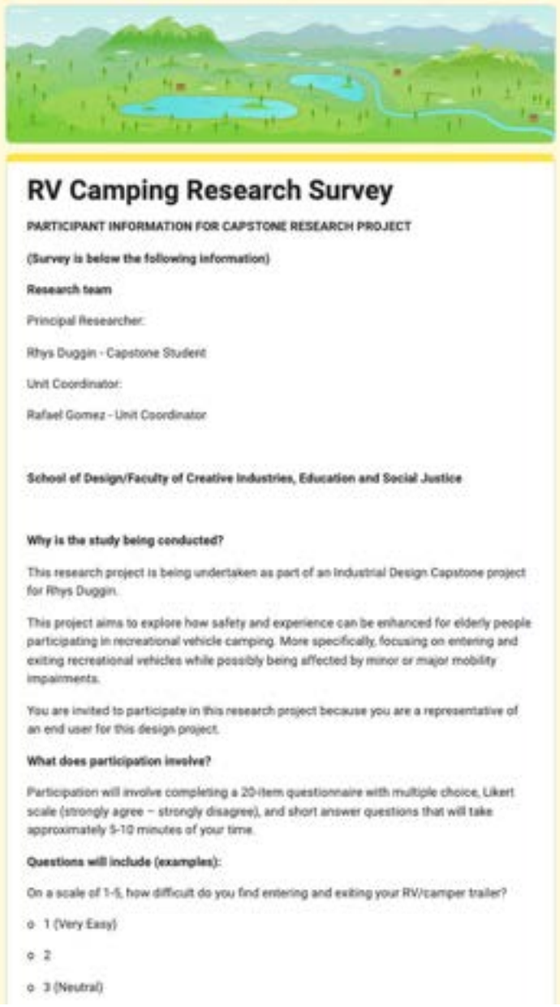
About featured snippets • Feedback

People also ask

What colors do elderly people like?

For the data collected from interview section, the results showed that the elder observers preferred red and yellow colors, disliked black and gray colors. In younger group, black and white colors were preferred, brown and purple colors were disliked.

Camping imagery



RV Camping Research Survey

PARTICIPANT INFORMATION FOR CAPSTONE RESEARCH PROJECT

(Survey is below the following information)

Research team

Principal Researcher:

Rhys Duggin - Capstone Student

Unit Coordinator:

Rafael Gomez - Unit Coordinator

School of Design/Faculty of Creative Industries, Education and Social Justice

Why is the study being conducted?

This research project is being undertaken as part of an Industrial Design Capstone project for Rhys Duggin.

This project aims to explore how safety and experience can be enhanced for elderly people participating in recreational vehicle camping. More specifically, focusing on entering and exiting recreational vehicles while possibly being affected by minor or major mobility impairments.

You are invited to participate in this research project because you are a representative of an end user for this design project.

What does participation involve?

Participation will involve completing a 20-item questionnaire with multiple choice, Likert scale (strongly agree – strongly disagree), and short answer questions that will take approximately 5-10 minutes of your time.

Questions will include (examples):

On a scale of 1-5, how difficult do you find entering and exiting your RV/camper trailer?

- 1 (Very Easy)
- 2
- 3 (Neutral)

Research Question:
How can safety and experience can be enhanced for elderly people participating in recreational vehicle camping?

SURVEY DESIGN

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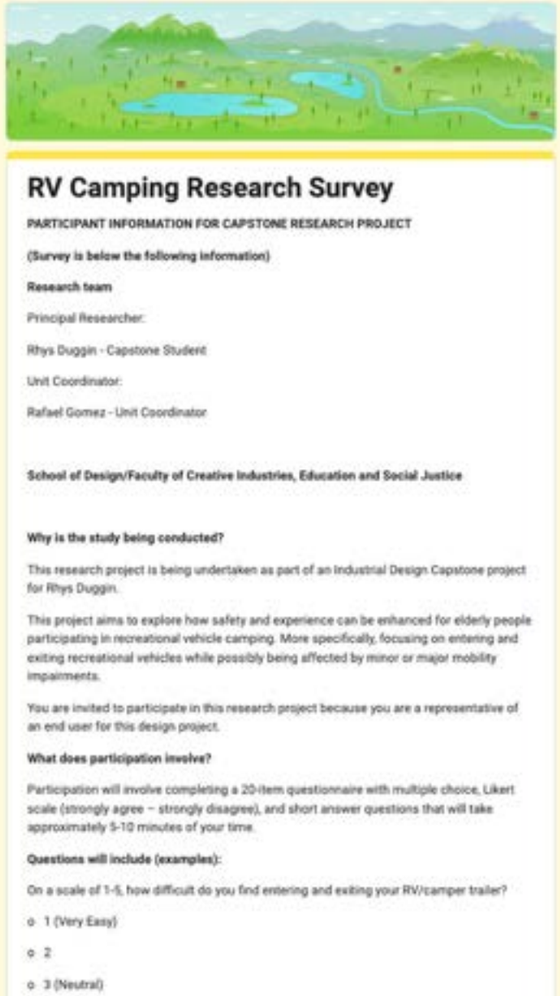

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On a scale of 1-5, how difficult do you find entering and exiting your RV/camper trailer?

- 1 (Very Easy)
- 2
- 3 (Neutral)

Camping imagery

Summary

Project Overview

- Enhance safety and experience for elderly RV campers.
- Focus on entry and exit with mobility impairments.

Research Question

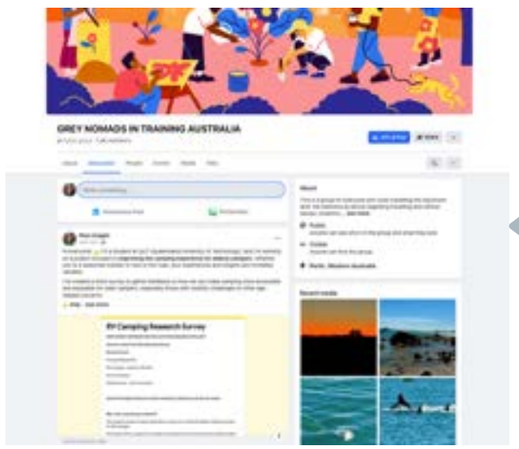
- How can safety and experience be enhanced for elderly RV campers?

Survey Elements

- Aesthetic choices for the survey.
- Use of camping imagery.

SURVEY SOCIAL MEDIA POSTS

FaceBook pages I posted In



REMOVED BY ADMIN

Post for FaceBook pages

Attention Grey Nomads!

Hi everyone! I'm a student at QUT (Queensland University of Technology), and I'm working on a project focused on improving the camping experience for elderly campers. Whether you're a seasoned traveler or new to the road, your experiences and insights are incredibly valuable.

I've created a short survey to gather feedback on how we can make camping more accessible and enjoyable for older campers, especially those with mobility challenges or other age-related concerns.

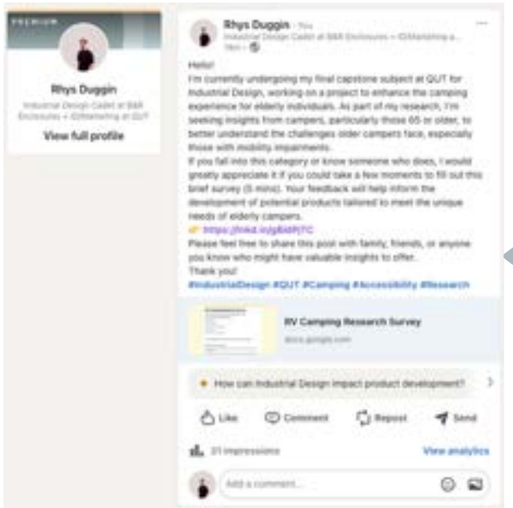
[Insert Survey Link Here]

Your input will play a crucial role in shaping better products and services that cater to the unique needs of the Grey Nomad community. Thank you so much for taking the time to help out!

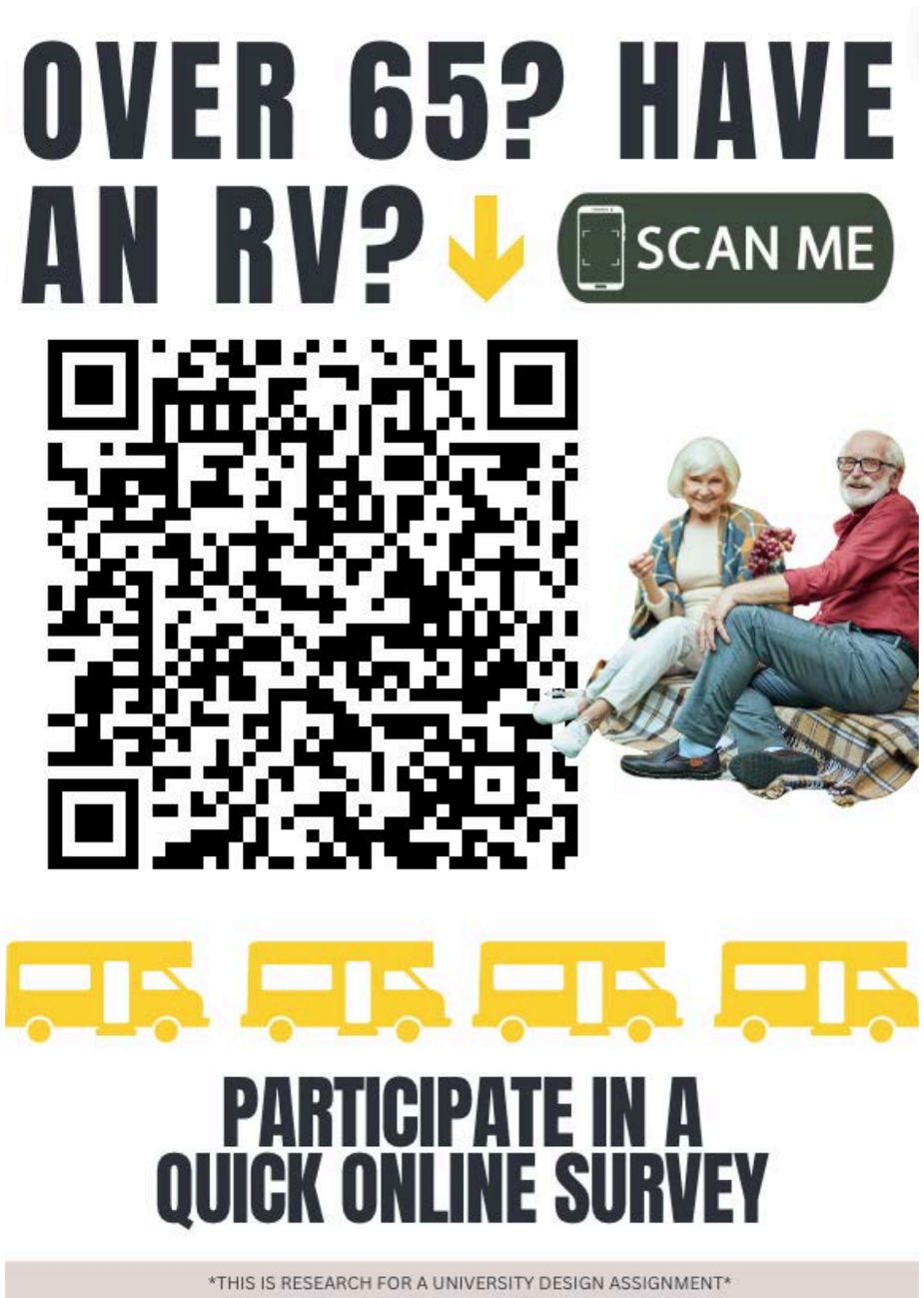
Wishing you safe and happy travels!

#GreyNomads #CampingLife #ElderlyCamping #QUTResearch #Survey

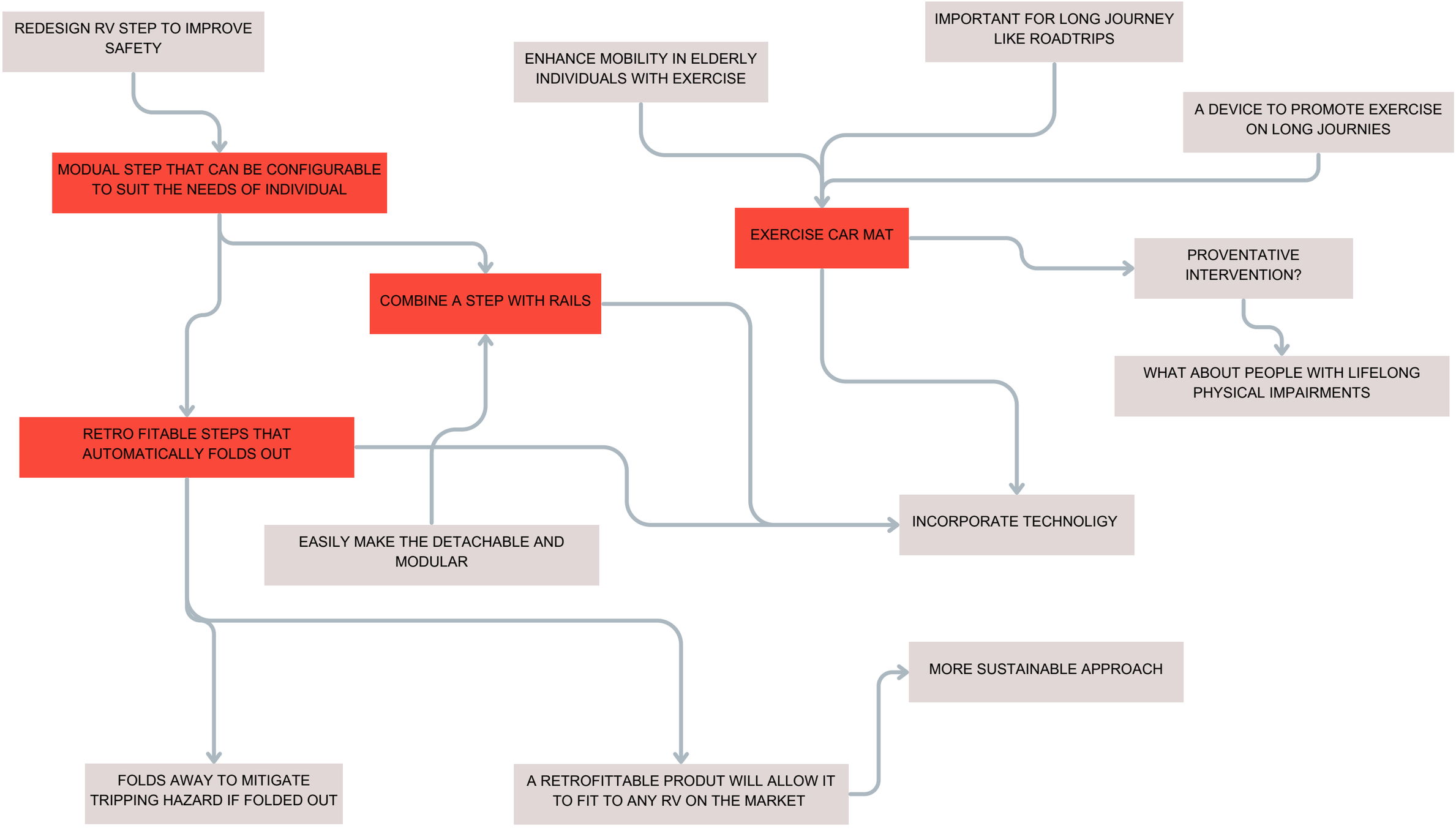
LinkedIn Post



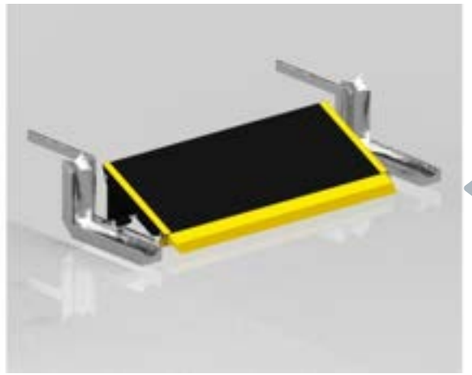
PHYSICAL POSTER TO ADVERTISE SURVEY



IDEATION


REDESIGN RV STEP TO IMPROVE SAFETY
MODUAL STEP THAT CAN BE CONFIGURABLE TO SUIT THE NEEDS OF INDIVIDUAL
ENHANCE MOBILITY IN ELDERLY INDIVIDUALS WITH EXERCISE
IMPORTANT FOR LONG JOURNEY LIKE ROADTRIPS
A DEVICE TO PROMOTE EXERCISE ON LONG JOURNIES
EXERCISE CAR MAT
COMBINE A STEP WITH RAILS
PROVENTATIVE INTERVENTION?
WHAT ABOUT PEOPLE WITH LIFELONG PHYSICAL IMPAIRMENTS
RETRO FITABLE STEPS THAT AUTOMATICALLY FOLDS OUT
EASILY MAKE THE DETACHABLE AND MODULAR
INCORPORATE TECHNOLIGY
MORE SUSTAINABLE APPROACH
FOLDS AWAY TO MITIGATE TRIPPING HAZARD IF FOLDED OUT
A RETROFITTABLE PRODUT WILL ALLOW IT TO FIT TO ANY RV ON THE MARKET

IDEATION



Elderly people may prefer ramps over stairs for several reasons. Walking on a ramp requires less leg extensor power and less joint rotation than negotiating stairs. Gait patterns employed on ramps are similar to those used on a level surface, while gait patterns associated with stairs are different.

ShareOK
https://shareok.org › bitstream › handle › 10.117... PDF

A Survey of Ramp and Stair Use by Older Adults - ShareOK

Stairs could turn into ramp in an easy way

Product to promote balance that leads to decrease risks of falling

★★★☆☆ 10

Balance Active Seat Posture Core Trainer | Improve Posture & Stability, Increase Back Muscle Strength Whil...

Balance Active Seat Posture Core Trainer | Improve Posture & Stability, Increase Back Muscle Strength While Sitting in Your Chair, Portable Exercise | Perfect Addition to Your Chair or Seating Setup : Sports &...

Amazon.com

How might we improve the accessibility into RV's for elderly individuals so that they can have a safer camping experience

EXERCISING WITH MOBILITY IMPAIRMENTS

Seymourpowell unveils smart gym mat concept

Seymourpowell's smart gym mat explores how technology and artificial intelligence will support future exercise environments and provide connected workouts within the home.

DesignWanted / Mar 10, 2022

Something like this but designed for using in cars and simple standing tasks

Analyzing qualitative data with thematic analysis and affinity mapping

In this post, we introduce thematic analysis and affinity mapping, explaining how these methods can help you thoroughly analyze qualitative data and derive actionable insights.

Hubble / Sep 27

Significant loss of mobility is not part of normal aging. In the healthy older person it may be more to do with inactivity. With regular exercise, strength and flexibility can be preserved for a longer time.

HealthInAging.org
https://www.healthinaging.org › tools-and-tips › caregive...

Caregiver Guide: Mobility Problems | HealthInAging.org

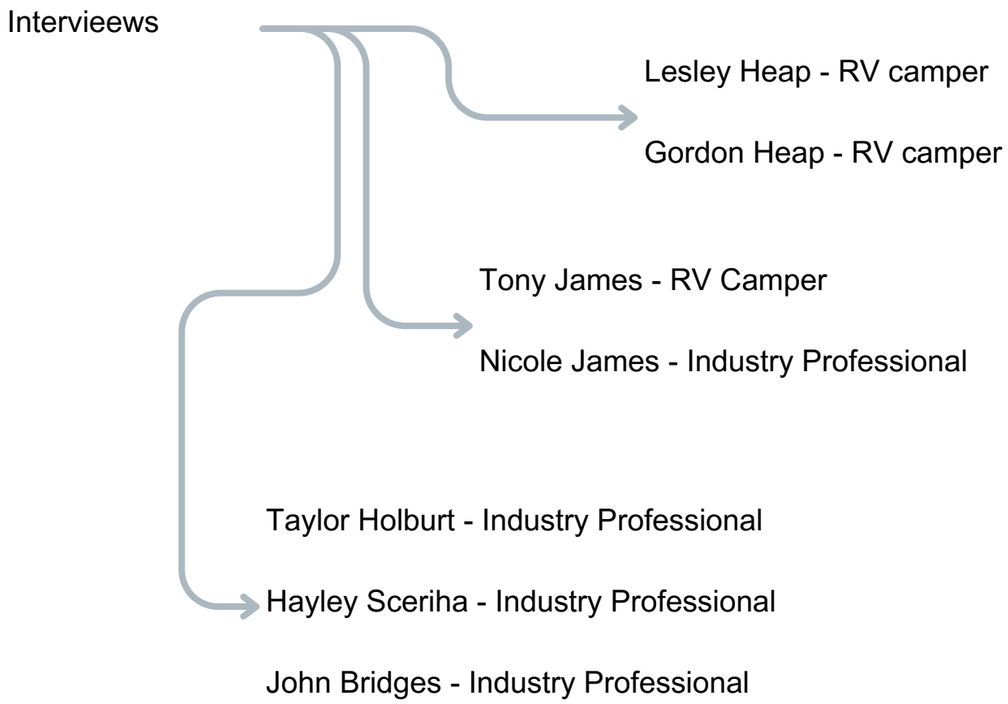
If injury, disability, illness, or weight problems have limited your mobility, there are still plenty of ways you can use exercise to boost your mood, ease depression, relieve stress and anxiety, enhance your self-esteem, and improve your whole outlook on life.

How to Exercise with Limited Mobility

Don't let injuries, disabilities, illness, or weight problems get in the way of exercise. These tips will get you going, no matter your limitations.

HelpGuide.org / Aug 21

INTERVIEW DESIGN



Research Question:
How can safety and experience can be enhanced for elderly people participating in recreational vehicle camping?

Objectives

1.	Understand the demographics, background, and camping habits of RV campers with mobility impairments.
2.	Evaluate current mobility solutions and identify areas for safety and accessibility improvements.
3.	Explore the impact of mobility impairments on activities and gather feedback on RV design enhancements.

https://www.tandfonline.com/doi/epub/10.1080/01442159X.2018.1497149?needAccess=true

INTERVIEW DESIGN

In-depth Interview Questions

- Probes will be used to gather more depth to questions.

To comprehensively understand the demographics, camping habits, mobility and safety challenges, preferences for safety features, and the use of mobility aids among the target audience.
Introduction
1. Can you please introduce yourself and tell me a little about your background?
General Camping Experience
2. How often do you go RV camping, and how long have you been doing it?
3. What type of RV or camper trailer do you currently use?
Mobility and Safety Challenges
4. Can you describe your typical experience when entering and exiting your RV/camper trailer?
5. What specific challenges do you face with mobility in and around your RV/camper trailer?
6. Have you ever had any incidents, such as falls or near-falls, while camping? If so, can you describe what happened and how it affected you?
Current Solutions and Adaptations
7. What modifications or adaptations have you made to your RV/camper trailer to improve safety and accessibility?
8. Do you use any mobility aids (e.g., cane, walker, wheelchair) while camping? How do these aids impact your camping experience?
9. Have you purchased any aftermarket products to help with mobility and safety? If so, which ones and how effective have they been?
Desired Features and Improvements
10. What features do you think would significantly improve your safety and ease of movement when entering and exiting your RV/camper trailer?
11. How important is it to you to have additional safety features such as non-slip steps, handrails, or better lighting?
12. What other aspects of RV/camper trailer design do you think could be improved to better accommodate your needs?
Recreational Activities and Preferences
13. What types of activities do you enjoy while camping, and do mobility impairments affect your ability to participate in these activities?
14. Are there any specific areas within the RV/camper trailer where you face more difficulty due to mobility issues?
Feedback on Design Ideas
15. If you could design a perfect RV/camper trailer for someone with your mobility needs, can you describe what it would it look like?
16. What kind of support or information would you find helpful when choosing or modifying an RV/camper trailer for better accessibility?
Follow-Up and Contact Information
18. Would you be interested in participating in future research or testing new product designs related to RV/camper trailer accessibility? If so, can you provide your contact information?

In-Depth interview

- Probes
  - *What else happened?*
  - *What do you mean by that?*
  - *Can you talk me through that?*
- Goal is to obtain accurate understanding of the respondent's perspective, experience, etc.
- Attention to verbals and non-verbals

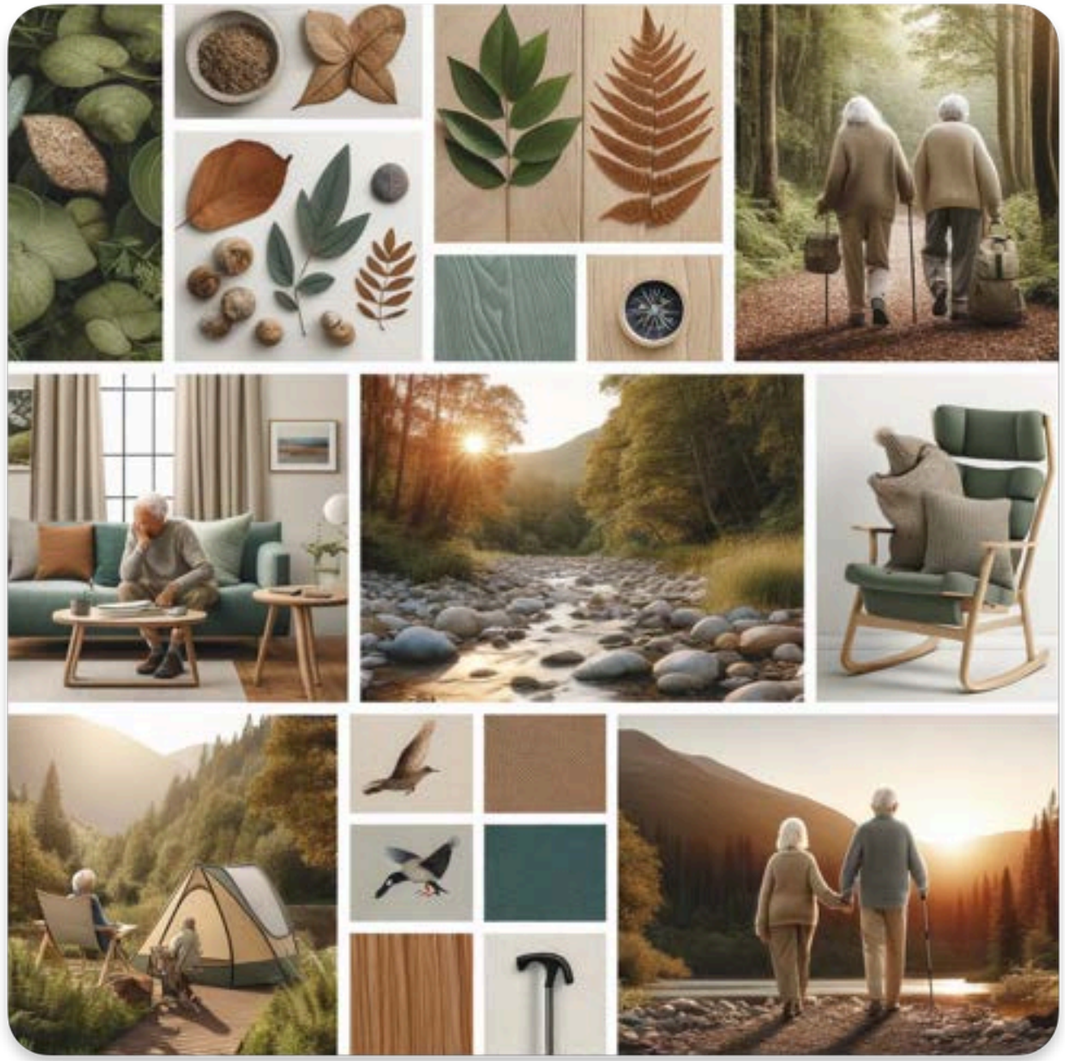
What is Depth Interviewing?

Depth interviews involve asking a series of open-ended questions to gain in-depth understanding

- Semi-structured format allows the interviewer to ask follow-up questions or probe for additional information
- Conversational tone
- Researcher's aim is to gain rich and detailed responses

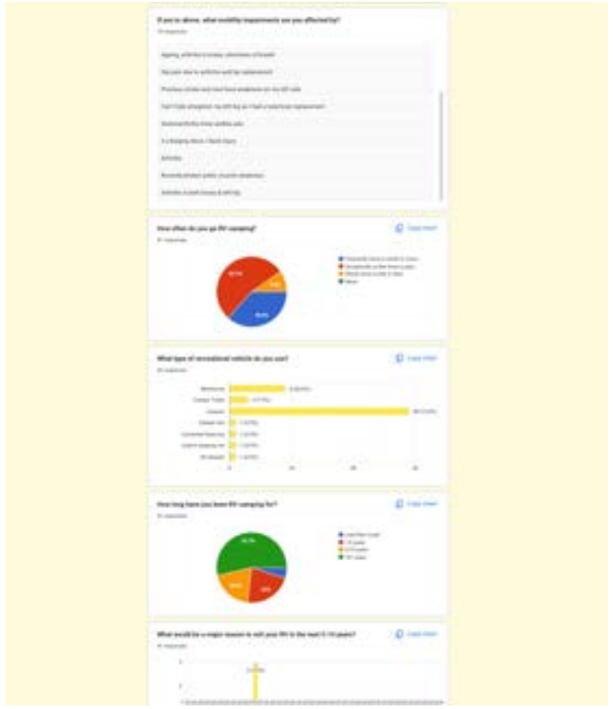
AESTHETICS MOODBOARD

CURVED, SLEEK, MODERN

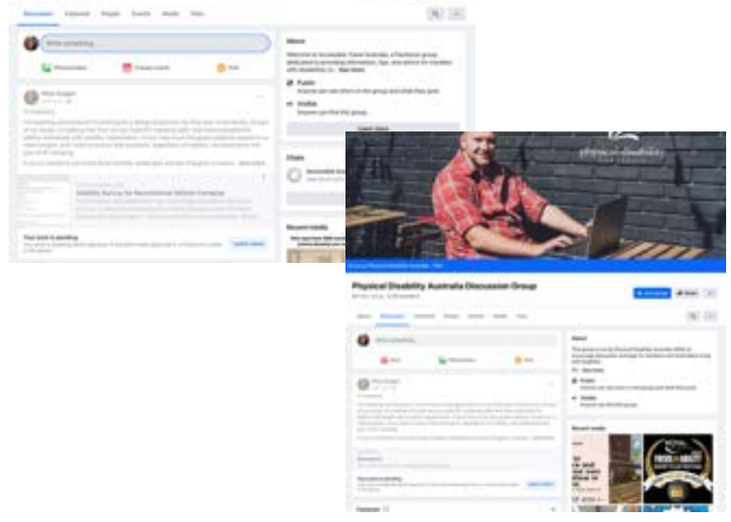


Earthy tones

SECOND SURVEY



FACEBOOK PAGES THE SURVEY WAS POSTED



WEEK 5

CHECK IN:

- Have done 3 interviews - Physiotherapist, AHA assistant/Student Physiotherapist and Aged Care Registered Nurse
- 39 Survey responses.
- Started transcribing scripts - Otter.AI
- Started Thematic Analysis
- **How many times do we go through and code the data?**
- **Do we have to show just one of each code in the results table and what themes it fits into?**
- **Is 3 interviews enough?**
- **Is annotating product images and writing out S&W count as benchmarking?**
- **Can we have multiple styles of benchmarking?**
- **How do we show benchmarking in our reports?**
- **Can we take screenshots of annotating product images from out DDR?**

Ideas so far:

- Modular steps - curved safe edges - soft materials on the side - easy assembly and disassembly.
- Adding fall detections into the step.
- Retrofittable hand rails with fall detection.
- LED light steps - modern sleek aesthetics.
- RV/Car exercise mat - increase exercise for elderly on long road trips.

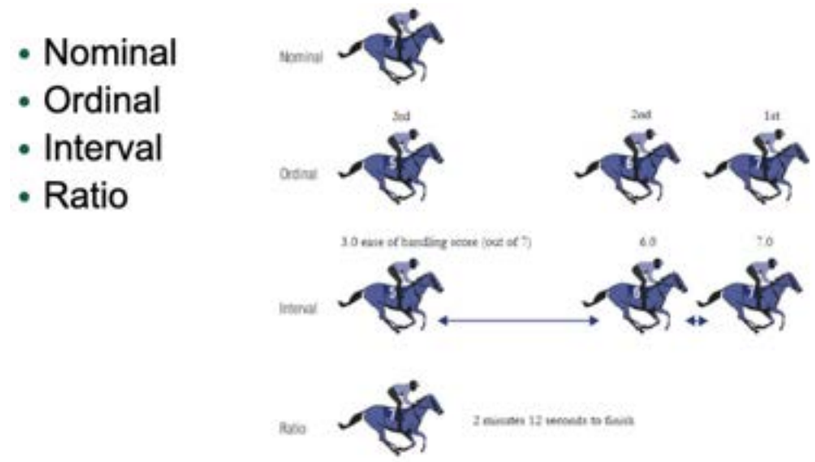
LEVELS OF MEASUREMENT

- Nominal / categorical
- Ordinal
- Interval
- Ratio/continuous
- Short answer

NOMINAL/CATEGORICAL

SUMMARISING:

- Number of responses to each category
- percentage of responses to each category
- calculating mean and media is useless
- sometimes makes sense to collapse categories



Anton:

- 3 interviews is enough
- Try and make the benchmarking styles the same and then put them into report.

DEFINE PHASE

RHYS DUGGIN

8/2024

THEMATIC ANALYSIS PROCESS

Codes from thematic analysis:

- Professional Experience
- Mobility Impairments Experience
- Mobility Aid
- Health issues / concerns / problems
- Mobility Impairment
- Stuck Inside
- Lack of space
- Mobility Problem
- Stair accessibility issue
- Fear due to mobility
- Fear due to mobility
- Aid not made for outdoors
- Accessibility issue
- Aid too large
- Accomodate elderly needs
- Not accomodating for Impairments
- Inside Accessibility issues
- Increase lighting
- Need for independence
- Health assessment
- Mobility challenge
- Health condition
- Mobility aid effectiveness
- Healthcare access
- Missing out due to mobility issues
- Accessibility Improvements
- Enjoyment of outdoors
- Elderly camping experience
- Planning and preparation
- Limited access to healthcare
- Limited knowledge on RV’s
- Accessibility improvement
- Quality of life
- Mental health
- Fatigue, Need for Rest
- Independence
- Access to pharmacy
- Balance

Themes	Codes
Mobility Impairments	Mobility Impairments Experience, Mobility Aid, Mobility Impairment, Mobility Problem, Mobility challenge, Balance
Health Issues	Health issues / concerns / problems, Health condition, Health assessment, Fatigue, Need for Rest, Healthcare access
Accessibility Challenges	Lack of space, Stair accessibility issue, Accessibility issue, Not accommodating for Impairments, Inside Accessibility issues, Accessibility Improvements
Fear and Safety Concerns	Fear due to mobility, Fear due to mobility (repeated), Aid not made for outdoors, Aid too large
Independence and Quality of Life	Need for independence, Quality of life, Enjoyment of outdoors, Independence
Elderly Camping Experience	Elderly camping experience, Planning and preparation, Limited knowledge on RV’s, Missing out due to mobility issues
Accessibility Solutions	Increase lighting, Accommodate elderly needs, Accessibility improvement, Access to pharmacy
Mental Health	Mental health
Healthcare Access	Limited access to healthcare, Access to pharmacy

THEMATIC ANALYSIS PROCESS

Themes	Codes	Description	Example from Transcript
Mobility Impairments	Mobility Impairments Experience, Mobility Aid, Mobility Impairment, Mobility Problem, Mobility challenge, Balance	**Covers challenges with mobility, including difficulty using aids, maintaining balance, and navigating tight spaces in RVs, which limit outdoor activity enjoyment.**	**“The most common mobility aid used on site was the 4 wheelie walker” - Jonathan**
Health Issues	Health issues / concerns / problems, Health condition, Health assessment, Fatigue, Need for Rest, Healthcare access	**Addresses concerns about health problems like fatigue, chronic conditions, and the need for healthcare access, affecting participants' camping experiences.**	**“They can fatigue quite easily.” - Jonathan**
Accessibility Challenges	Lack of space, Stair accessibility issue, Accessibility issue, Not accommodating for Impairments, Inside Accessibility issues, Accessibility Improvements	**Focuses on physical barriers like inadequate space, stairs, and general accessibility issues, hindering safe and free movement in the RV environment.**	**“As the individuals increased in age, there muscle mass decreased making it more difficult for them to get up and down the stairs.” - Jonathan**
Fear and Safety Concerns	**Fear due to mobility, Fear due to mobility (repeated), Aid not made for outdoors, Aid too large**	**Highlights anxiety related to navigating with mobility impairments, leading to fears that prevent full enjoyment of camping activities.**	**"A lot of elderly people have a fear of falling." - Hayley**
Independence and Quality of Life	**Need for independence, Quality of life, Enjoyment of outdoors, Independence**	**Reflects the desire to stay independent despite mobility challenges, affecting the ability to enjoy activities and overall life satisfaction.**	**“Mobility issues affect their everyday lives, not just camping” - Taylor**
Elderly Camping Experience	**Elderly camping experience, Planning and preparation, Limited knowledge on RV’s, Missing out due to mobility issues**	**Explores the specific challenges elderly participants face in camping, including preparation, limited RV knowledge, and mobility-related restrictions.**	**“Many of them longed to be outdoors and travelling the country.” - Jonathan**
Accessibility Solutions	**Increase lighting, Accommodate elderly needs, Accessibility improvement, Access to pharmacy**	**Covers suggestions for enhancing the camping experience, like better lighting and accommodations to improve accessibility for those with impairments.**	**"The main issue would be getting their mobility aid inside the RV." - Hayley**
Mental Health	Mental health	**Examines how mobility limitations and being confined indoors negatively impact participants' mental well-being.**	**“People get a lot of joy out of going outside and things like that, so I'd say that would definitely have an effect on their mental health.” - Taylor**
Healthcare Access	Limited access to healthcare, Access to pharmacy	Highlights the difficulties in accessing healthcare and pharmacies while camping, stressing the importance of medical support in remote areas.	"Access to healthcare is a huge barrier, especially in rural areas." - Taylor

DEVELOP PHASE

RHYS DUGGIN

8/2024

DESIGN IMPLICATIONS

The following section of the report will explore how the research findings can be applied to create a design that capitalises on the identified opportunities. Using this research, innovative solutions can be drawn from the insight.

Aesthetics

As per the research, the design **should** incorporate aesthetic principles, demonstrated in the benchmarking process. For example, soft colours, clean lines, and shapes that are familiar with elderly users can make a product more approachable and less intimidating.

Ergonomics to Suit Elderly

The product **must** include ergonomic considerations that suit elderly needs, especially those who have milder mobility issues like arthritis. Features like adjustable components or contoured surfaces that support natural body postures could help prevent strain and fatigue, thereby enhancing comfort and usability during extended use in RV camping settings.

Supportortive

Products **should** be designed with an understanding of specific needs like joint support, weight distribution, and enhanced stability. Features like non-slip materials, secure anchoring points, and built-in handles can reduce the risk of falls and provide a sense of security, fostering independence in camping environments.

Advanced Materials

Innovative materials **could** be used to improve design elements. For instance, lightweight composites could replace certain metal or plastic components. Moreover, incorporating advanced sustainable materials is an option. The RV industry appears to have a gap in utilising advanced materials.

Sustainability Considerations

Sustainability factors **must** to be considered for this product. This could include choosing eco-friendly materials, reducing waste in manufacturing, and streamlining production methods. Additionally, the product **must** be design for durability, ease of repair, and recyclability at the end of their lifecycle align with environmental objectives and cost-effectiveness, appealing to environmentally conscious consumers.

Advanced Technology

The product **could** include advanced technology into the design and each end of the cost spectrum. Advanced technology like smart sensors, or AI could significantly enhance the functionality of products for elderly users.

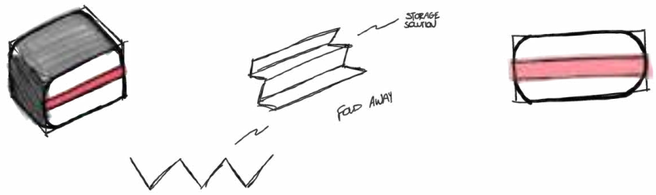
Lightweight / Portability

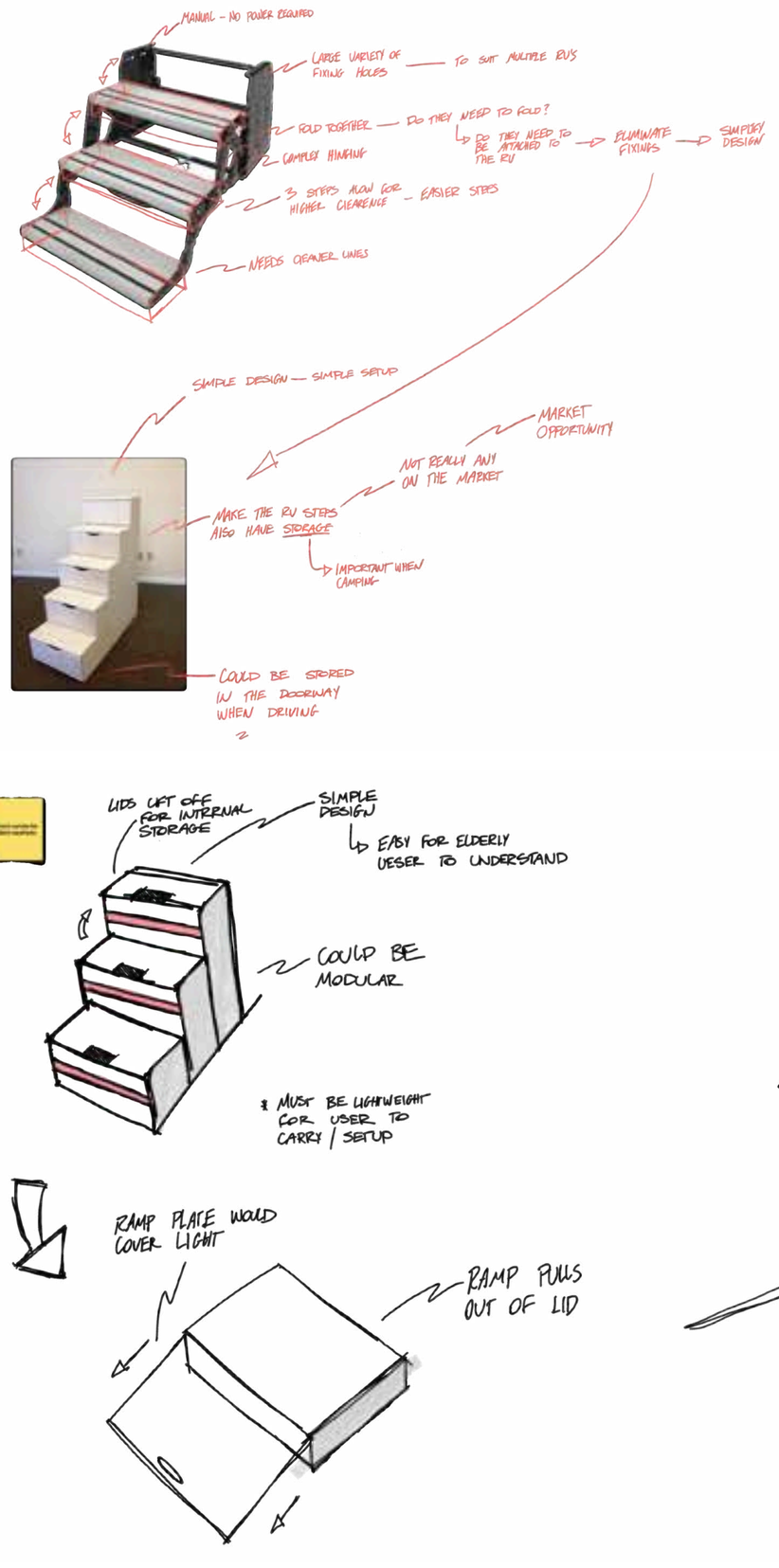
The product **must** be lightweight and portable which is critical for elderly users who may have limited strength or mobility. Reducing product weight while maintaining stability and functionality improves portability for users.

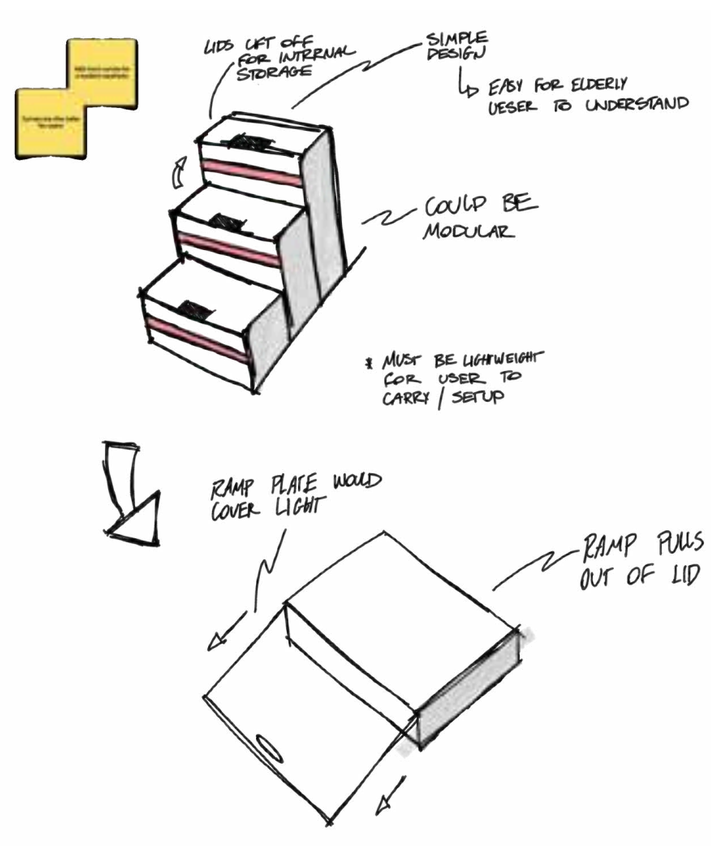
Simplicity

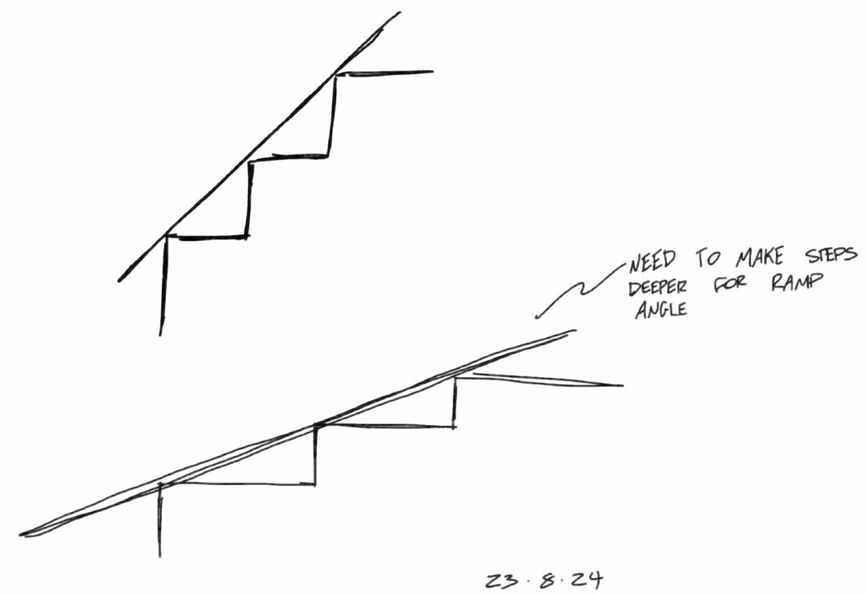
The design **must** be simple, but not too simple. Simplicity in design ensures that products are easy to understand and use, which is particularly important for elderly individuals who may have cognitive impairments. Moreover, products designed with simplicity in mind also tend to have fewer points of failure, enhancing reliability and encouraging independent use among elderly users.

IDEATION


STORAGE SOLUTION
FOLD AWAY


MANUAL - NO POWER REQUIRED
LARGE VARIETY OF FIXING HOLES
TO SUIT MULTIPLE RV'S
FOLD TOGETHER
DO THEY NEED TO FOLD?
DO THEY NEED TO BE ATTACHED TO THE RV
ELIMINATE FIXINGS
SIMPLIFY DESIGN
COMPLEX HINGING
3 STEPS ALLOW FOR HIGHER CLEARENCE - EASIER STEPS
NEEDS CLEANER LINES
SIMPLE DESIGN — SIMPLE SETUP
MARKET OPPORTUNITY
NOT REALLY ANY ON THE MARKET
MAKE THE RV STEPS ALSO HAVE STORAGE
IMPORTANT WHEN CAMPING
COULD BE STORED IN THE DOORWAY WHEN DRIVING


LIDS LIFT OFF FOR INTERNAL STORAGE
SIMPLE DESIGN
EASY FOR ELDERLY USER TO UNDERSTAND
COULD BE MODULAR
* MUST BE LIGHTWEIGHT FOR USER TO CARRY / SETUP
RAMP PLACE WOULD COVER LIGHT
RAMP PULLS OUT OF LID


NEED TO MAKE STEPS DEEPER FOR RAMP ANGLE
23 · 8 · 24

WEEK 6 LECTURE

A1 Part 1:

- Visuals are very important.
- 48h extension is allowed Sunday 8th with the extension.
- Word count - include word count on the bottom of the cover page. 2800-4000 words.
- Can go over the word count in necessary.
- Authenticity statement - after the table of contents - copy the statement provided.
- AI Use statement - also after the table of contents.
- Make sure you follow the report structure.
- Make the report clear, neat and

A1 Part 2:

- 48h extension available for presentation hand in.
- Text and context are important to presentation slides.
- Presentation is not marked

Questions for Tutor:

- **How do we choose what data to display - what questions, graphs from out primary research?**
- **Can we have two different types of benchmarking techniques and can we display these in out report in multiple ways?**
- **Bench marking tables in appendix? matrix in report?**
- **Thematic analysis in appendix? using commenting feature in word?**
- **3 pros (2 physios and an aged car nurse), 40 elderly campers - enough?**
- **Survey results are mostly leaning towards RV step redesign?**
- **Can all my concepts be different step design opportunities?**
- **Thematic analysis to short answer questions? same table as interview?**
- **How do we choose what data to focus on?**

Summary

A1 Part 1:

- Visuals are crucial.
- Word count: 2800-4000 words; include on cover page.
- Authenticity and AI use statements after the table of contents.
- Follow the report structure; ensure clarity and neatness.
- 48-hour extension available.

A1 Part 2:

- 48-hour extension for presentation submission.
- Importance of text and context in slides.
- Presentation is not graded.

WEEK 6

ChatGPT: what are some importatn HDC consideration for redesigning one?

OpenAI. (2024). ChatGPT [Large language model]. https://chatgpt.com/c/e14038d6-8a97-4390-bfda-3c1e250e4398

1. User Accessibility and Safety
Step Height and Depth: Steps should have an appropriate height and depth to accommodate users with varying mobility levels. The rise (height) should be low enough to prevent strain when stepping up or down, while the depth (tread) should be wide enough to allow stable foot placement.
Non-Slip Surfaces: Ensure the steps have a non-slip surface or textured tread that provides good traction even in wet or slippery conditions. Materials like rubberized strips, perforated metal, or anti-slip coatings can enhance safety.
Handrails or Grab Handles: Including handrails or grab handles can provide additional support and stability, especially for elderly users or those with mobility impairments.
Edge Visibility: Incorporate high-contrast colors or reflective strips on the step edges to improve visibility in low-light conditions, reducing the risk of missteps.
2. Ergonomics and Comfort
Step Sizing: Design steps with comfortable dimensions that suit a wide range of users, including children, adults, and elderly individuals. Ergonomic considerations ensure that steps are neither too steep nor too narrow.
Angle and Inclination: The angle of the steps should be gentle enough to minimize strain on the legs and knees. This is particularly important for users who may have balance issues or joint pain.
Comfortable Use with Footwear: Consider the types of footwear users may wear while stepping (e.g., hiking boots, sandals) and ensure the steps provide adequate grip and space.
3. Portability and Storage
Folding or Retractable Design: For portable steps, consider a folding or retractable design that allows for easy storage and transport. The mechanism should be smooth, intuitive, and safe to operate without pinching hazards.
Weight and Materials: Use lightweight materials like aluminum or composite materials that are strong yet easy to carry. Reducing weight is crucial for elderly users or those with limited strength.
4. Durability and Weather Resistance
Material Selection: Choose materials that are durable, rust-resistant, and capable of withstanding outdoor conditions (e.g., aluminum, galvanized steel, or treated composites). This is important for steps exposed to rain, sun, and varying temperatures.
Corrosion Resistance: Apply coatings like powder coating or galvanization to metal steps to enhance corrosion resistance and longevity.
Easy Maintenance: Steps should be easy to clean and maintain. Smooth surfaces and simple designs can help reduce dirt buildup and simplify maintenance tasks.
5. Inclusive Design for Diverse Users
Design for Mobility Impairments: Consider the needs of users with disabilities, such as those who use canes, walkers, or wheelchairs. Steps should be compatible with mobility aids, with options like lower steps or integrated ramps.
Adjustable Features: Offering adjustable step heights or widths can cater to users with different abilities or preferences. Adjustable steps can also accommodate different ground levels or uneven surfaces.
6. Aesthetics and Brand Alignment
Visual Appeal: Ensure that the design is visually appealing and matches the aesthetics of modern caravans or RVs. Consider using clean lines, sleek finishes, and attractive colors.
Customization Options: Provide options for customization, such as different finishes, colors, or branding elements, to appeal to a broader market.
7. Ease of Installation and Use
Simple Installation: For fixed steps, ensure that the installation process is straightforward and does not require specialized tools or skills. Clear instructions and universal mounting options can enhance user experience.
User Instructions and Feedback: Provide clear, intuitive user instructions, and consider adding visual cues or labels for operating folding mechanisms or securing the steps. Feedback mechanisms (e.g., click sounds when locked in place) can reassure users of correct usage.
8. Cost Efficiency and Value
Cost-Effective Manufacturing: Consider manufacturing techniques that balance quality with cost-effectiveness, such as using standardized components or lean manufacturing practices.
Value Proposition: Ensure that the redesign offers clear value to users, whether in terms of enhanced safety, durability, or convenience. Understand the target market and price point to make the product competitive.
9. Sustainability
Eco-Friendly Materials: Use sustainable or recyclable materials where possible. For example, opt for recyclable metals or composite materials with recycled content.
End-of-Life Considerations: Design with disassembly in mind to allow for easy recycling or repurposing of parts at the end of the product's life cycle.
10. User Feedback and Iteration
User Testing and Prototyping: Conduct user testing with real-world users, including those with different abilities and demographics. Gather feedback on usability, comfort, and safety, and iterate the design accordingly.
Continuous Improvement: Consider a feedback loop where users can provide input even after the product launch, enabling ongoing improvements.

WEEK 7 LECTURE - INSPIRATION UCD/ERGONOMICS

Design Development

- Valuable
- Innovative
- Purposeful
- Functional
- Usable
- Enjoyable
- Manufacturable
- Detailes
- Presentable.

Inspiration

- Khimtan - instagram

UCD

- Designed to be usable for all - universal design
- Physical
- Psychological
- Emotional
- Think about the product in different scenarios - unintended environments.
- Think about information overload - buttons, screens, setup. instructions
- Cognition - familiarity - do not confuse the user.
- Experience - before, during, after. - product lifecycle.
- Experiential - personal and social - role to play in terms of error acceptance.
- Materiality - think about finishes and how it impacts the user.
- Ergonomics - prototyping to engage with the products.

- Think about labels

- Vision - important consideration for elderly
- Body size and function
- Force and strength
- Carrying limits

- Elderly people are usually less strong.
- What are the lifting limits

- Emotional - how does the step make them feel

- Psychological - the step needs to make them feel safe.

- Rugged
- Waterproof
- Durabel
- Long lasting
- IP resistance
- Low light

WEDNESDAY 13TH NOVEMBER

- **End of year exhibition**

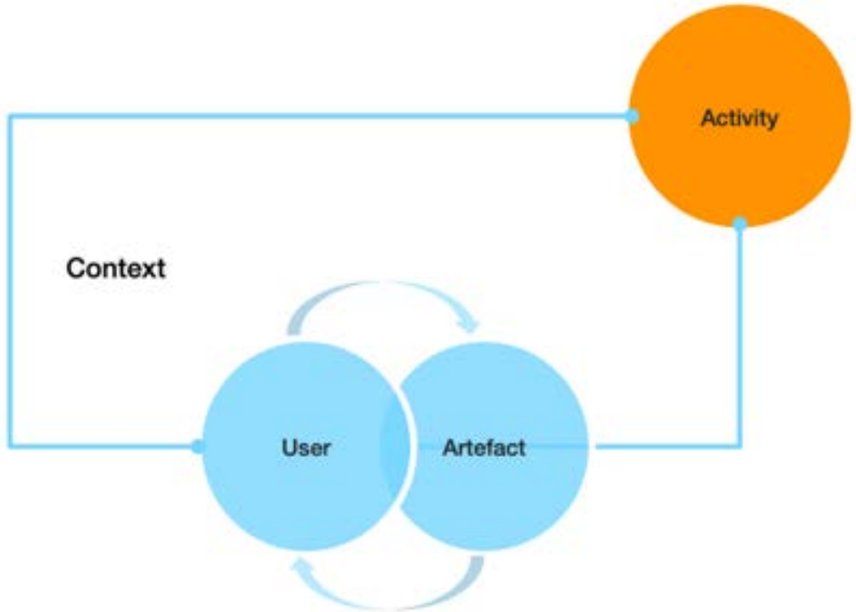
- Thursday 12th September - final concept presentation.
- 8-10 students
- Digital presentation
- Student led presentation
- Get feedback

WEEK 8 LECTURE - USER EXPERIENCE

Experience Design - create an appropriate positive experience before, during and after user-product-context interaction.

- Experience focused (user expectations)
- Time (longitudinal)
- Context (relevance)

- Familiarity
- Challenge - does the user have to resolve a challenge.
- Novelty - how do you think about the complexity of balancing familiarity and novelty.
- Tradition - what are the traditions in the context, product category.
- Sentimental - retro look and feel? - careful around this.



Need to understand and conceptualise user-product interaction in context. Must also consider how this evolves over time

5 Principles of Interaction for Product Design

- Affordances - The relationship between the properties of a product and the capabilities of the agent using the product.
- Signifiers - communicate where the action should take place, what is happening and what other possible options exist - **very important**
- Mappings - the association / relationship between an action and an event.
- Feedback - the means of communicating the result of an action.
- Conceptual models - Conceptual models are mental models that people create in their minds of how certain things can be done with a product

WEEK 8 LECTURE - MANUFACTURING

Bill of Materials (BOM) - Evolves over the design process.
Standard Parts
Custom Parts
Drawings
Quality Assurance

Standard Parts
Standard' parts or 'off the shelf' parts are items that are produced to a
standard or of such a high quantity that they are readily available - fixings, wheels, hard drives usb's, pcb, motors, extrusions.

Bill of Materials
Bill Of Material(s) or B.O.M is a list of standard and custom parts
required to manufacture a particular product – like a list of ingredients in a
recipe.

Importance
Because we've asked you to do it – advancing your knowledge
Industry standards
Quality Control
Quality Assurance
Specification
Effective communication between all parties
Legal assurance
Budgeting

Custom Parts
Custom' parts or 'designed' parts are the items that you sketch, CAD,
tool and manufacture. Also includes artwork, packaging, graphics. These
are the exciting components; all the skills learnt in your degree
(sketching, model-making, detailing, etc) are aimed at allowing you to
achieve these customs parts to a high degree

1. **Sheet metal enclosures**
2. **Injection mouldings**
3. **Specific mechanisms**
4. **Die Castings**
5. **Brackets**
6. **Gaskets**
7. **Artwork**
8. **Machined parts**

Quality Assurance
Quality Assurance (QA) is a way to track all parts ever sourced or produced by a
design firm.
Companies outsourcing work to Industrial Design firms will tend to first look at
the firm's portfolio then look at their QA procedures. From there they may even
conduct an audit.
Having sound Specification Drawing skills and well laid out B.O.M's will form part
of the overall QA system in a company.

Think about the components / parts in your design. What are standard (off-the-shelf) and what are custom parts?
Develop a BOM for your design. Build on it through the semester.
Consider what you want to show in a technical drawing package? How much detail do you want to include? How many parts? Can you indicate some aspects of your design in an exploded view?

WEEK 9

Design features + functions + technology:
What is the product you are designing?
What does the product do?
What technology does it need to do what it is intended to do?
Design usability:
How do you make the design usable for the intended market?
Have you considered context of use - how does this impact usability requirements?
Generate low-level prototypes (in whatever way you think is best) to test your assumptions about the design.
Learn as much as you can about your user group so that you can design for their needs.
Experience design + manufacturing:
What kind of experiences will your user have with your product (think before, during and after user-product interaction)
Really dig deep into the context of use and how this impacts experience
Which are standard parts and which are bespoke parts in your design?
Start to understand and explore manufacturing techniques used in your design for the various components and parts.
From this week onwards you will continue to refine the design in other areas including CMF, detailing, packaging (if relevant), and presentation leading up to the final week of presentation.

Capstone Braindumping

- Wheels to make the stairs/ramp more easily moved around.
- Use super light weight materials for ease of use - elderly are not as strong.
- Keep it modular - so many benefits.
  - Modular Steps - AI optional step
- Should use a loud alarm when AI Detects fall due to signal issues in remote areas.
- What is the product?
  - An assistive entry device.
- What technology?
  - AI Camera Speaker
- Context of use?
  - Camping outdoor environments
- Create some empathy maps

AESTHETICS INSPIRATION

- Modular - tech option
- Long lasting
- Modern aesthetics - automotive design inspired
- Simple
- Ergonomic
- Light weight
- Rugged

WEEK 11 LECTURE - FINAL SUBMISSION REVIEW

SUBMISSION REQUIREMENT:
- Final report
- DDR
- Physical model
- CAD
- Technical docs
- Video

FINAL REPORT
- Delete all identifiable information from report - images, names.

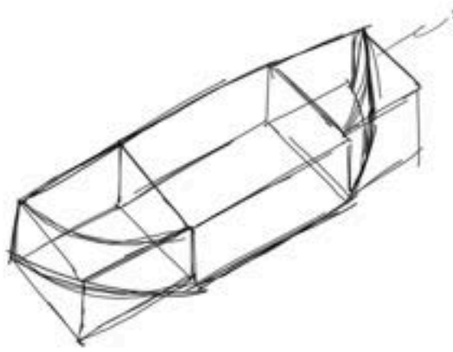
DDR
- Include everything in the design process.
- Just need to see chronological logic - no need for dates

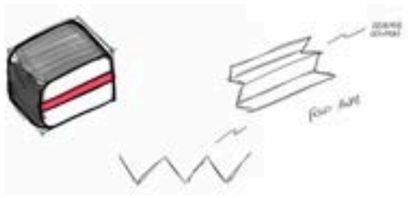
PROTOTYPING
- Low fi
- Ho fi
- Any sort of prototyping

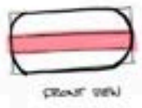
TECHNICAL DOCS
- Exploded view - at the very least
- BOM
- Part Drawings - don’t need all if too complicated

VIDEO PRESENTATION
- 1-3 mins
- indicate key features
- compare to products on the market
- can be all sorts of things
-

Ideation Sketches







SIMPLE DESIGN — SIMPLE SETUP

MARKET OPPORTUNITY

NOT REALLY ANY ON THE MARKET

MAKE THE RV STEPS ALSO HAVE STORAGE

IMPORTANT WHEN CAMPING

COULD BE STORED IN THE DOORWAY WHEN DRIVING

* RETROFITABLE KIT THAT ATTACHES TO EXISTING STEP ON THE MARKET

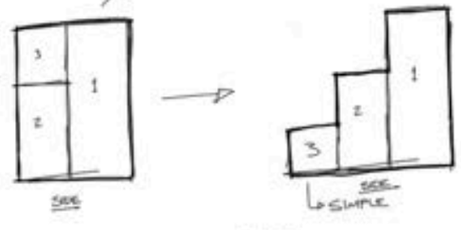
HANDLE + PADDING

SIDE

Like that you can use existing steps - sustainable and viable

STORED TOGETHER
↳ KEEPS IN PLACE

* NEED DEEPER STEPS

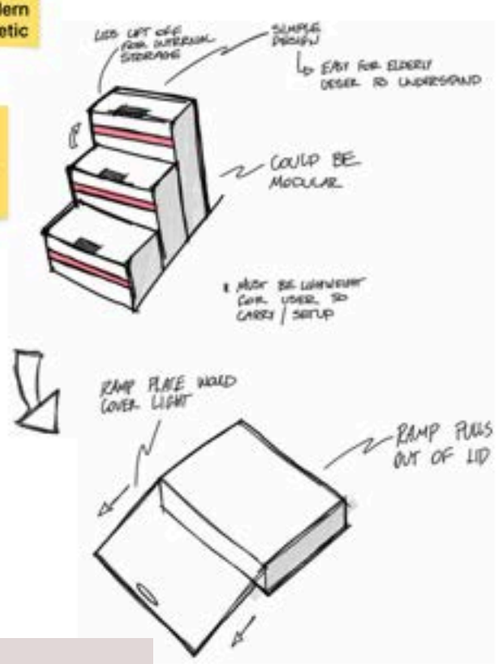


Like the simplicity of this design

1·9·24

Add more curves for a modern aesthetic

Curves are also safer for users

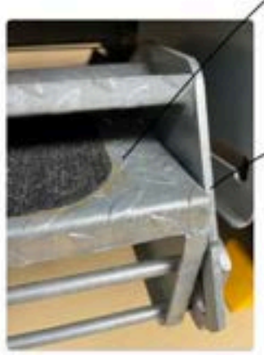


23·8·24

Testing Existing Steps

LOW DOWN AND HARD TO UNFOLD
↳ ESPECIALLY FOR ELDERLY

MAJOR TRIPPING HAZARD - ESPECIALLY AT NIGHT



EXPOSED GLUE

PINCH EDGES

VERY HIGH OFF THE GROUND

HARD TO UNFOLD DUE TO METAL ON METAL

BOLTS TO RV FRAME

LEVER FOR HOLDING / LOCKING IN PLACE

WELDED CONSTRUCTION

RUST - BRANDNEW - MATERIAL SELECTION
↳ HAZARD

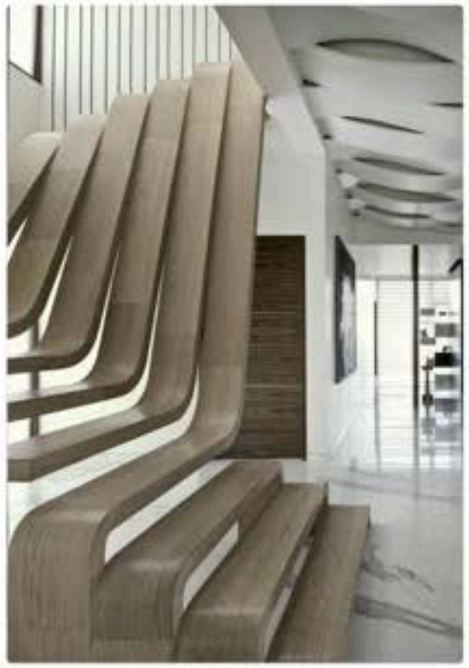
IMPORTANT FACTOR

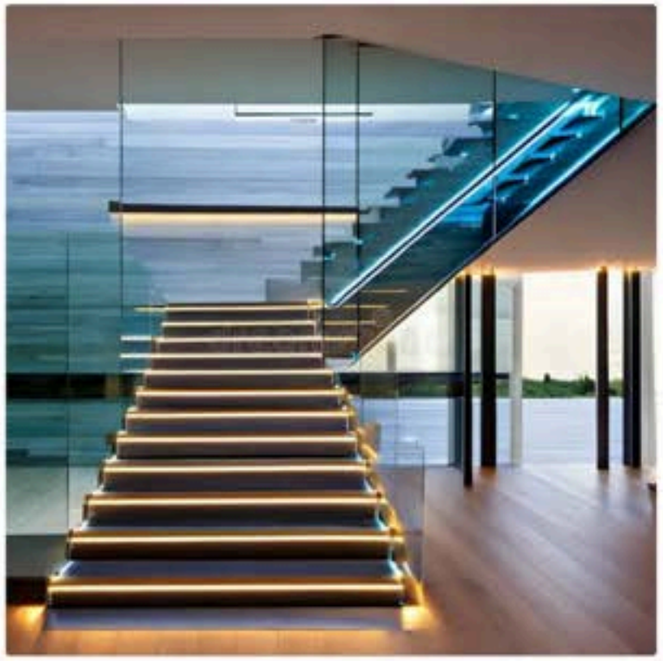
VERY DURABLE

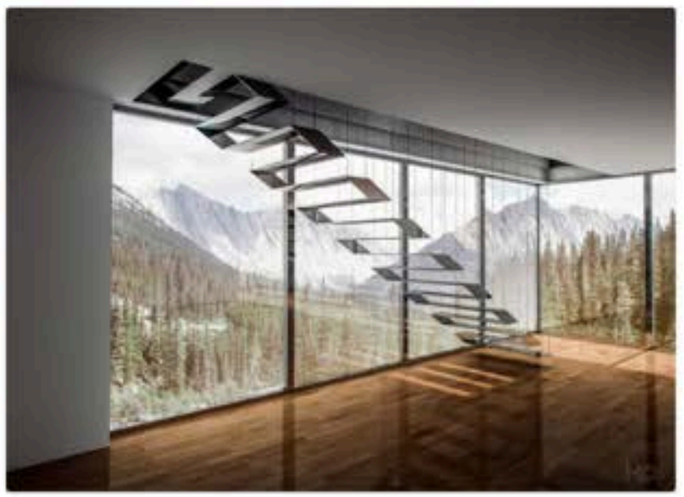
COULD PULL HANDLES
↳ STOP THE NEED OF BENDING DOWN

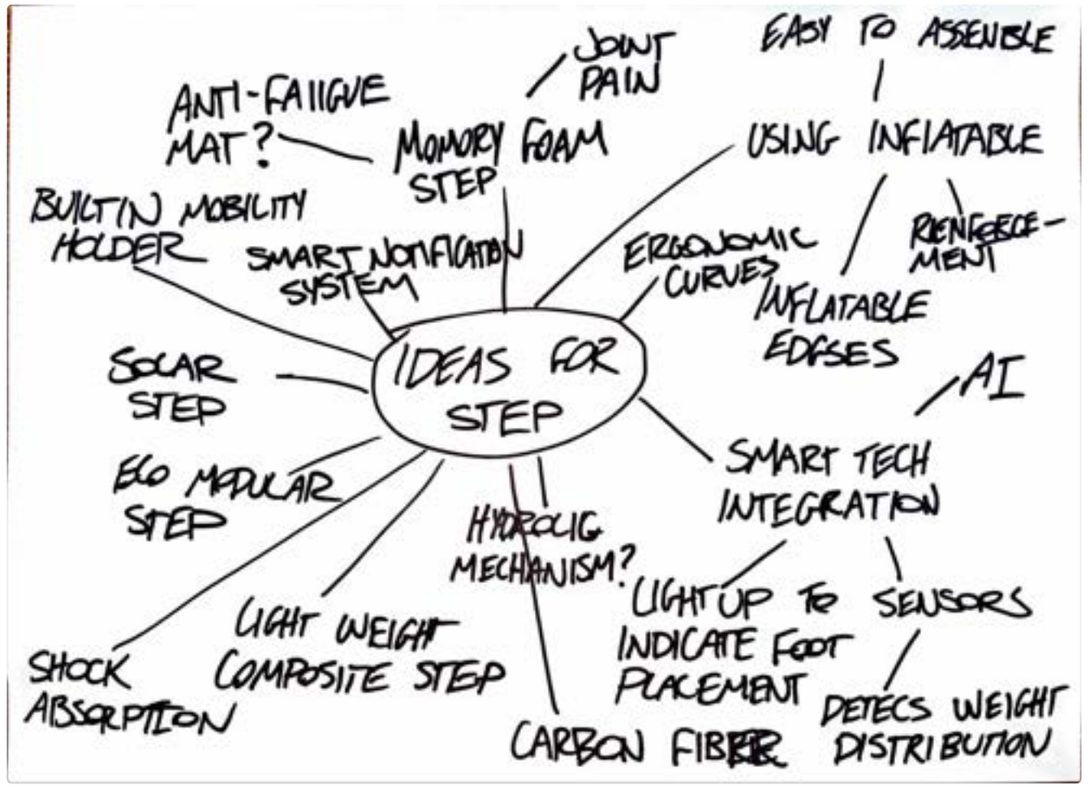
STAIRS FOR MOBILITY IMPAIRMENTS

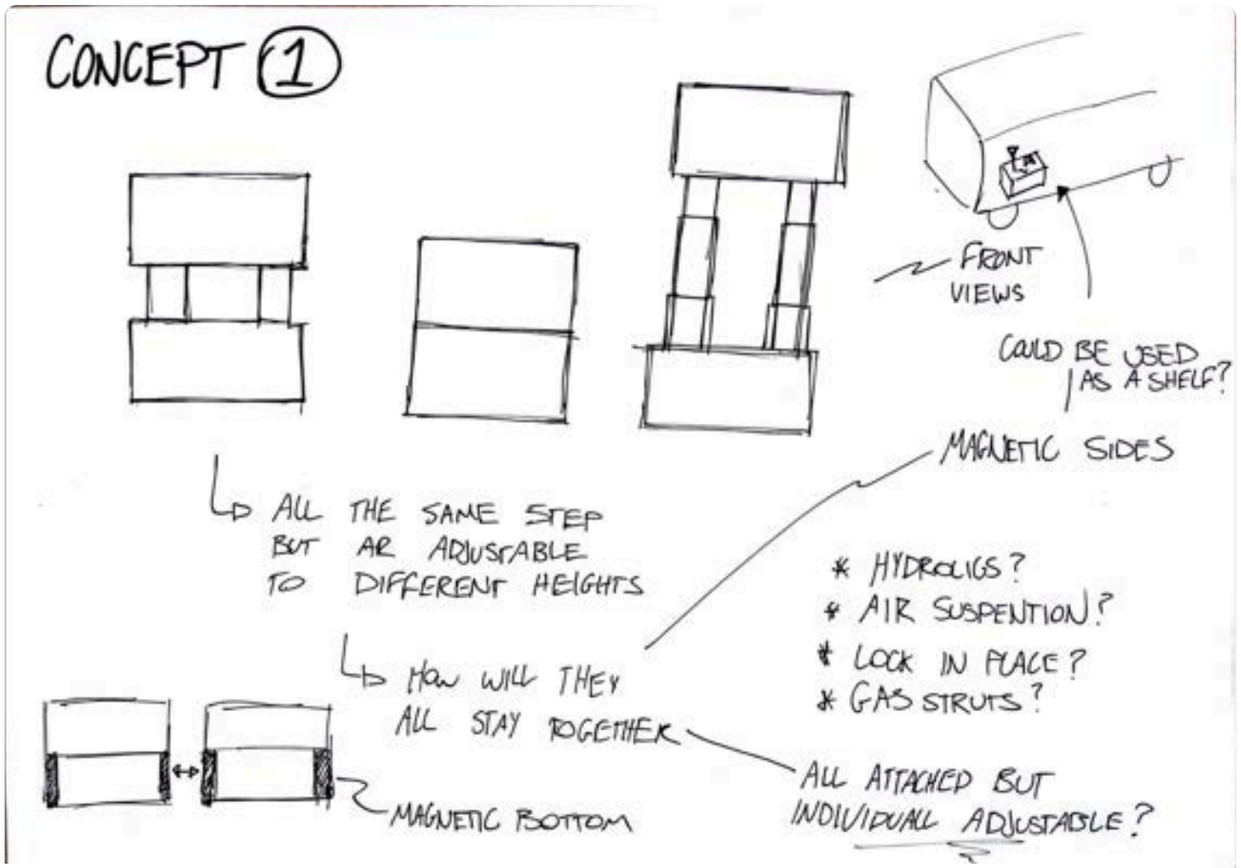
STAIR INSPIRATION

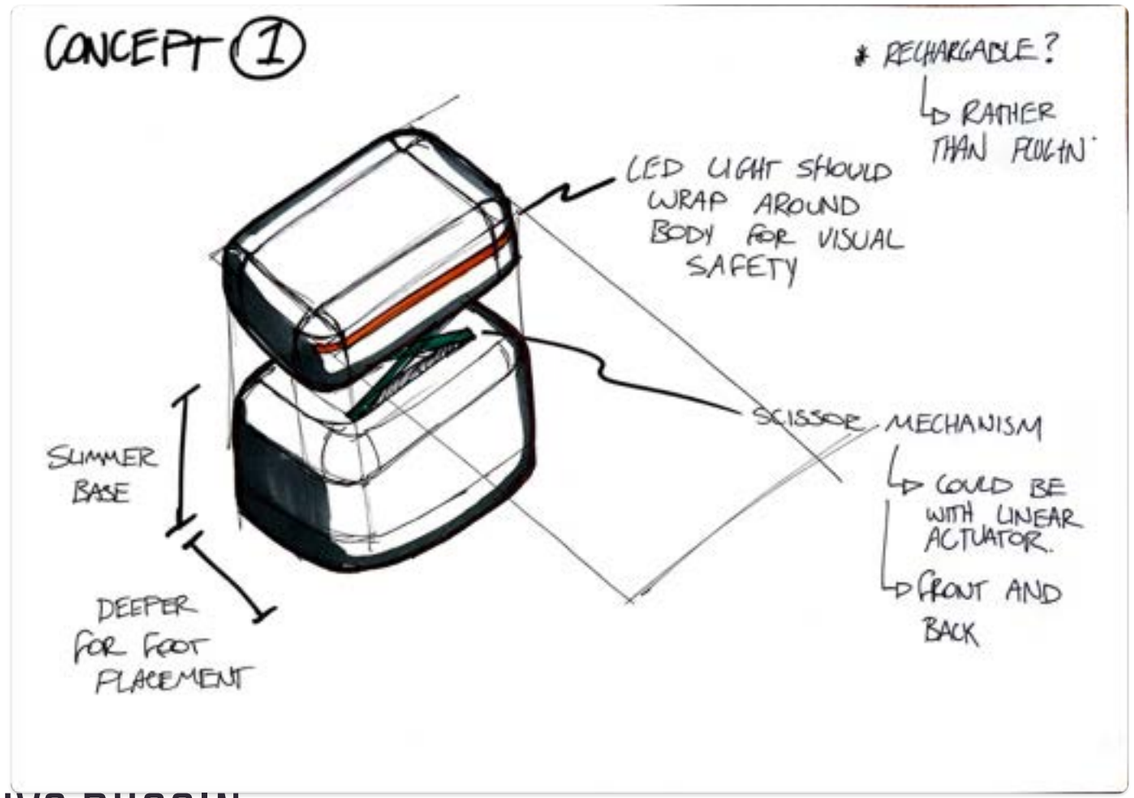


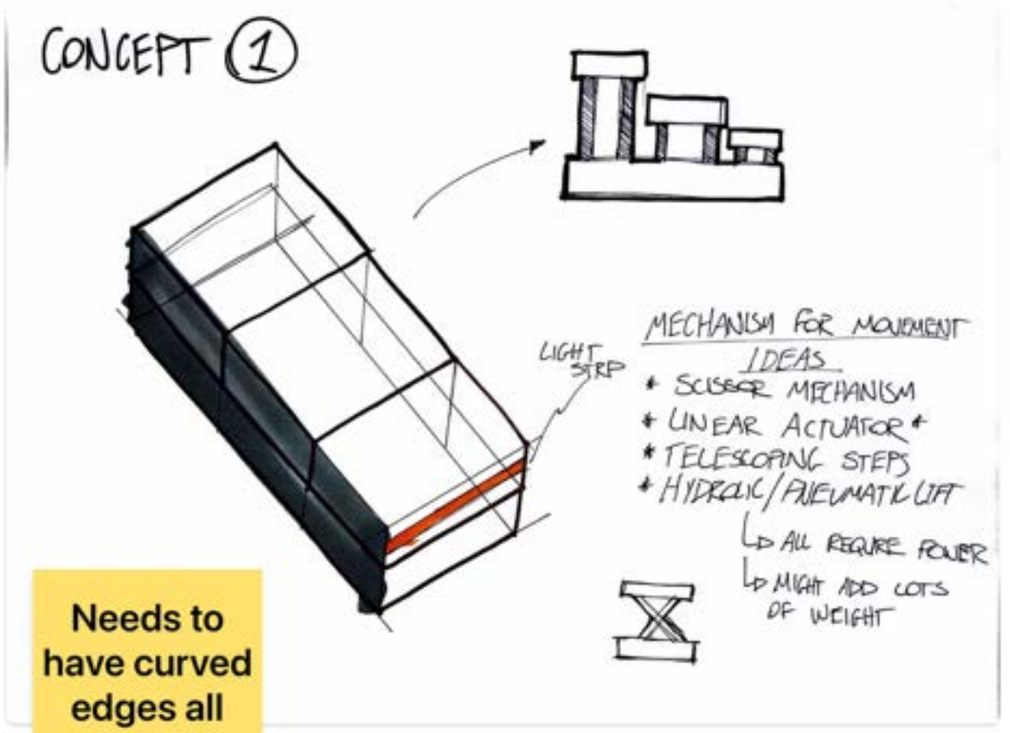





IDEAS FOR STEP
ANTI-FATIGUE MAT?
JOINT PAIN
MEMORY FOAM STEP
EASY TO ASSEMBLE
USING INFLATABLE
BUILT IN MOBILITY HOLDER
SMART NOTIFICATION SYSTEM
ERGONOMIC CURVES
REINFORCE-MENT
INFLATABLE EDGES
SOLAR STEP
AI
ECO MODULAR STEP
SMART TECH INTEGRATION
HYDROLIC MECHANISM?
LIGHT UP TO INDICATE FOOT PLACEMENT
SENSORS
SHOCK ABSORPTION
LIGHT WEIGHT COMPOSITE STEP
CARBON FIBER
DETECS WEIGHT DISTRIBUTION

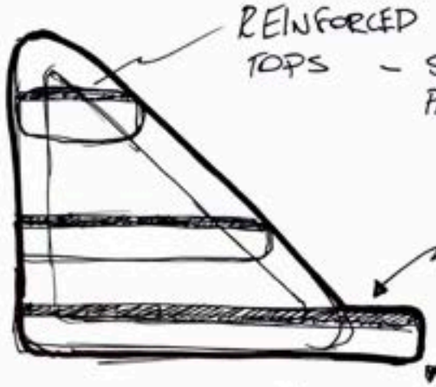

CONCEPT (1)
FRONT VIEWS
COULD BE USED AS A SHELF?
MAGNETIC SIDES
ALL THE SAME STEP BUT AR ADJUSTABLE TO DIFFERENT HEIGHTS
* HYDROLICS?
* AIR SUSPENTION?
* LOCK IN PLACE?
* GAS STRUTS?
HOW WILL THEY ALL STAY TOGETHER
ALL ATTACHED BUT INDIVIDUAL ADJUSTABLE?
MAGNETIC BOTTOM


CONCEPT (1)
* RECHARGABLE?
RATHER THAN PLUG IN
LED LIGHT SHOULD WRAP AROUND BODY FOR VISUAL SAFETY
SCISSOR MECHANISM
COULD BE WITH LINEAR ACTUATOR.
FRONT AND BACK
SLIMMER BASE
DEEPER FOR FOOT PLACEMENT


CONCEPT (1)
LIGHT STRP
MECHANISM FOR MOVMENT
IDEAS
* SCISSOR MECHANISM
* LINEAR ACTUATOR *
* TELESCOPING STEPS
* HYDRAULIC/PNEUMATIC LIFT
ALL REQUIRE POWER
MIGHT ADD LOTS OF WEIGHT
Needs to have curved edges all round

INFLATABLE STEP

ISO VIEW



SIDE VIEW

REINFORCED TOPS – SIMILAR TO PADDLE BOARD

RIGID

INFLATABLE CHAMBERS

"DURABILITY"

CONFORMS AROUND RUGGED TERRAIN

* SHOCK OBSORBING
* EASY TO ASSEMBLE
* MIGHT NOT LOOK/FEEL STURDY

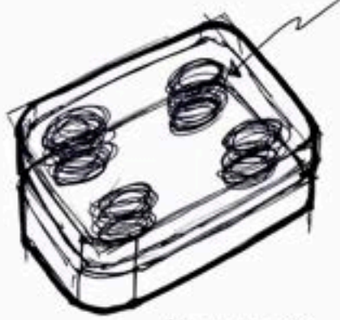
→ SHARP EDGES

→ POP

COLAPSES DOWN – DEFLATED

CONCEPT (2)

SHOCK OBSORBING SPRING



ISO VIEW

SIDE VIEW

GOOD FOR JOINT PAIN

→ IF FOLDED INTO RAMP – COULD BE TRIPPING HAZARD?

CONCEPT (3)

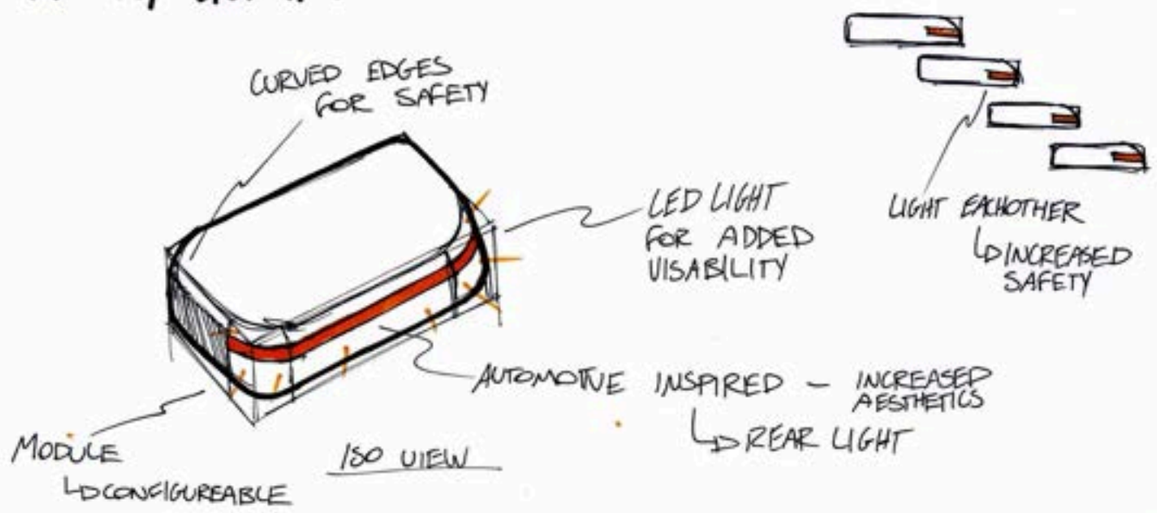
~~* IF STEP IS NOT ATTACHED TO RV, IT MUST HAVE SELF LEVELING.~~

RV IS LEVEL, BUT STEP IS NOT

→ DISERERAT FRONT RV

* SHOULD STEPS BE ATTACHED TO RV?
→ LEVELING CONSIDERATIONS.

STEP W/ LIGHTING

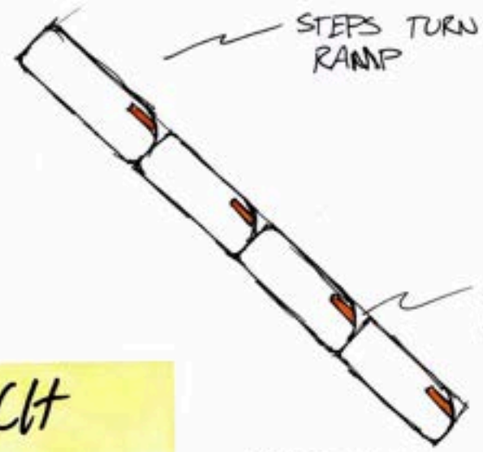


CONCEPT (4)

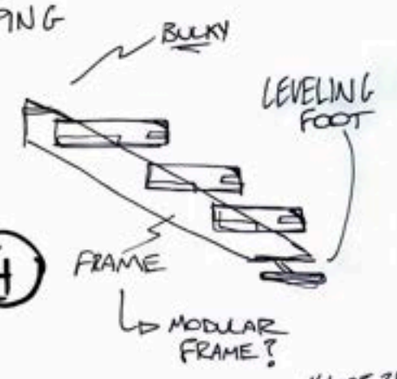
* INTEGRATE SMART TECHNOLOGY?
  ↳ AI, SENSORS,
* HOW WILL IT BE POWERED?

14.08.24

STEP W/ LIGHT – RAMP



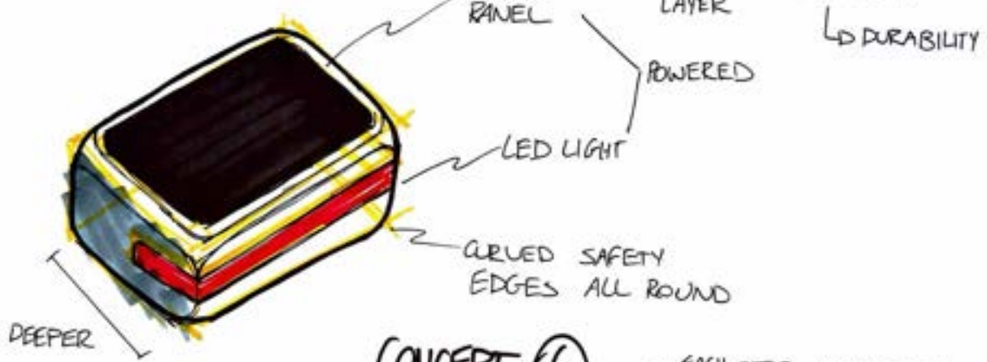
ATTACH TO RV



CONCEPT (4)

14.08.24

SOLAR STEP



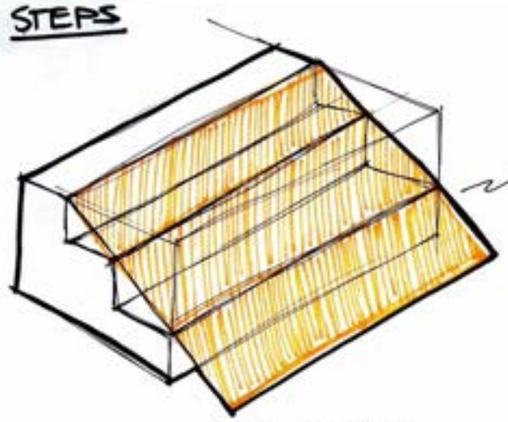
CONCEPT (4)

- EACH STEP IS ITS OWN POWERED MODULE

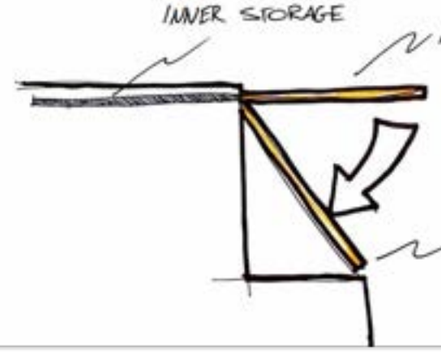
* EXPENSIVE? – VIABILITY
* CAN YOU STAND ON SOLAR PALEL?
* MANUFACTURING COMPLEXITY?
* IP RATING
* STEP HAS TO ACT AS AN ELECTRICAL ENCLOSURE

3.09.24

STEPS

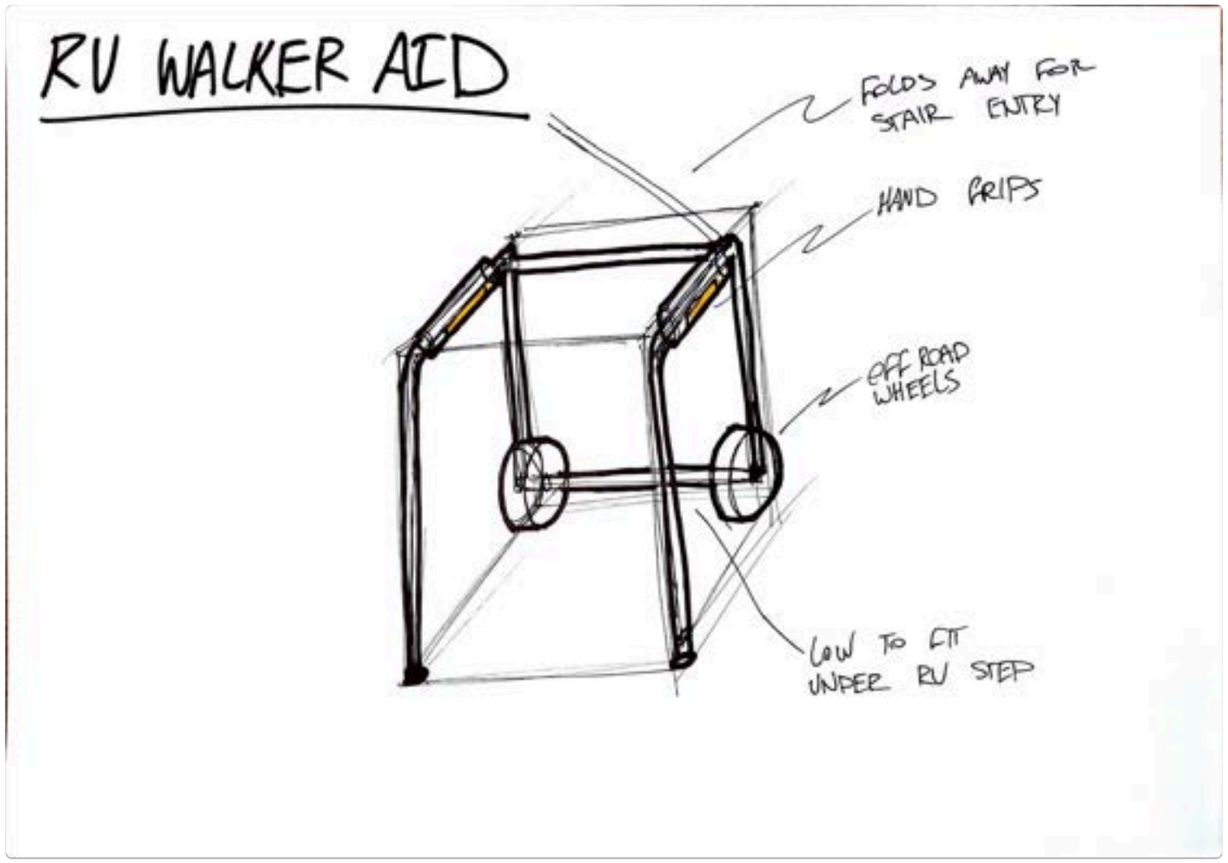


* COULD THE WHOLE DEVICE BE COLAPSABLE?
* CONSIDER WIEGHT
  ↳ ELDERLY LIMITATIONS
* MODULAR - ADAPTABLE
* RAILS – ADD ONS – FOLDOUT?

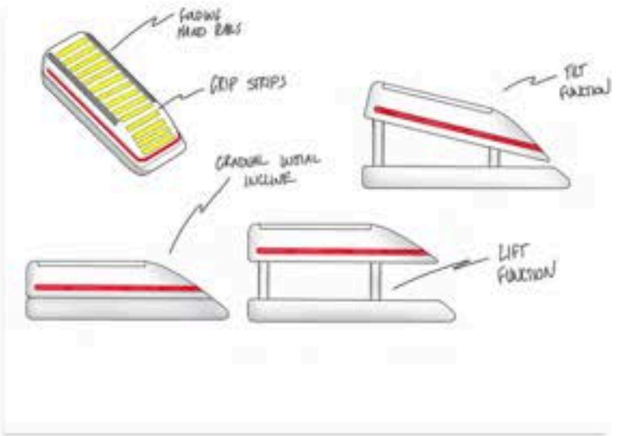


CONCEPT (5)

13.08.24


RV WALKER AID
FOLDS AWAY FOR STAIR ENTRY
HAND GRIPS
OFF ROAD WHEELS
LOW TO FIT UNDER RV STEP

CONCEPT



LINK TO RESEARCH

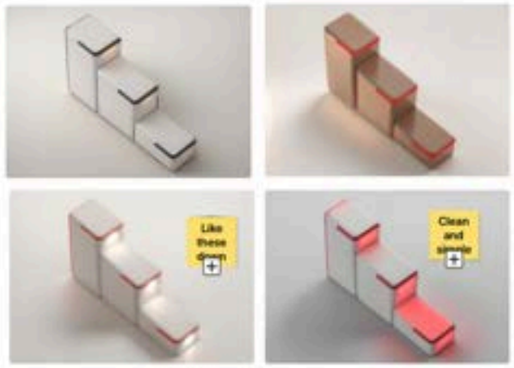
- Addressing accessibility challenges for getting into the RV.
- Addresses safety concerns relationg to navigating with a mobility impairment.
- Allows people to stay independent when entering the RV.

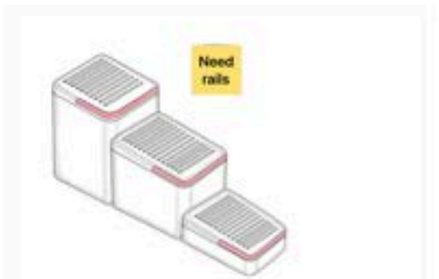
- Powered lift system.
- Comletly height adjustable.
- Tilt function for ramp mode.
- Foldout rails for additional support.
- LED light strip for enhanced visibility.
- Grip on top for non-slip finish.
- Composate materials for weight saving.
- Practical design

8/9/24

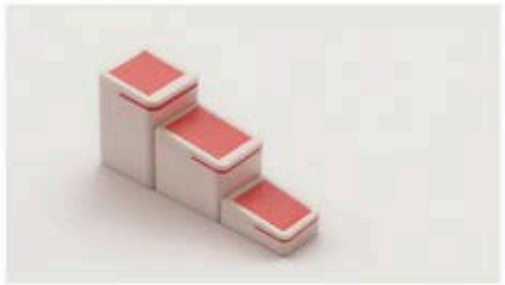
CONCEPT

VIZCOM

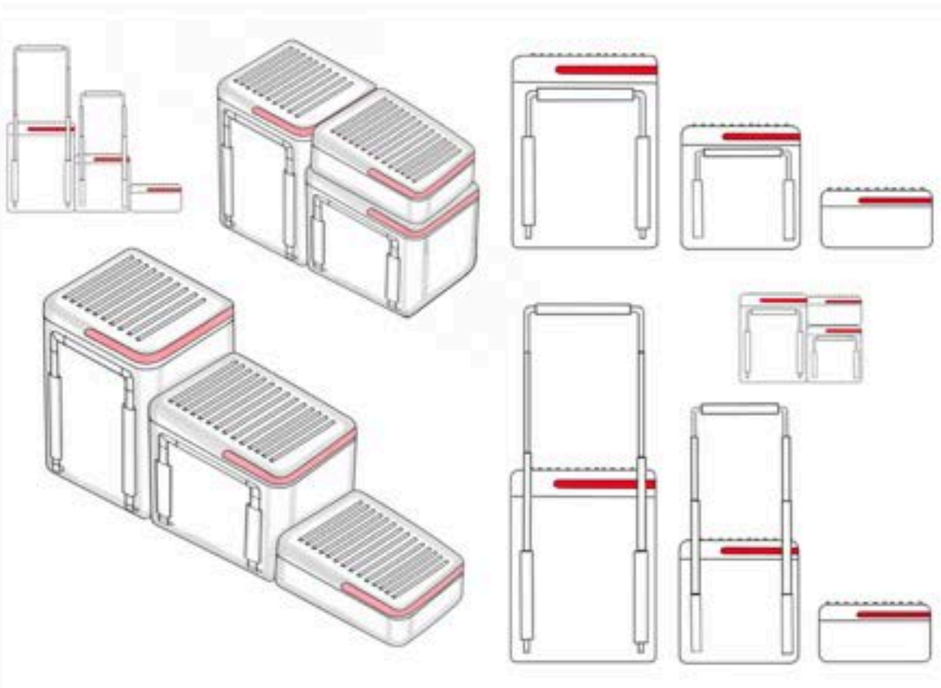




VIZCOM



9/9/24

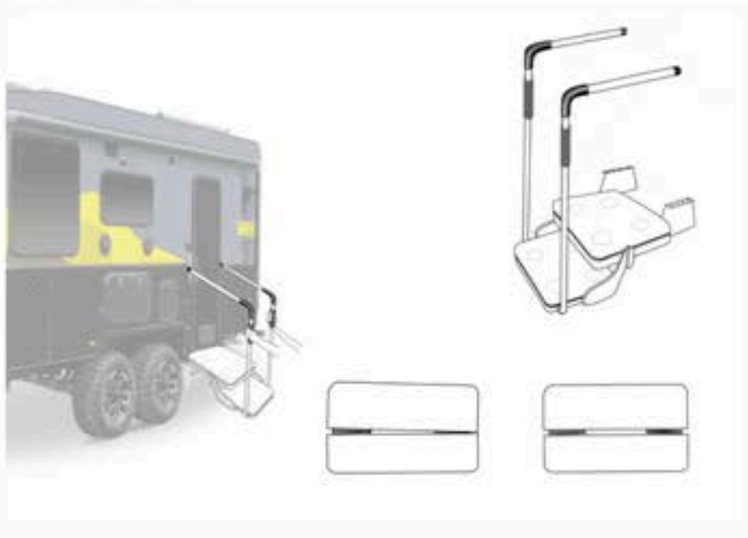


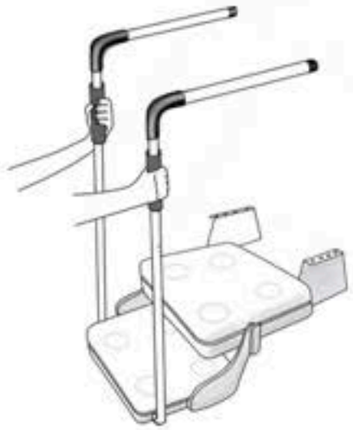
LINK TO RESEARCH

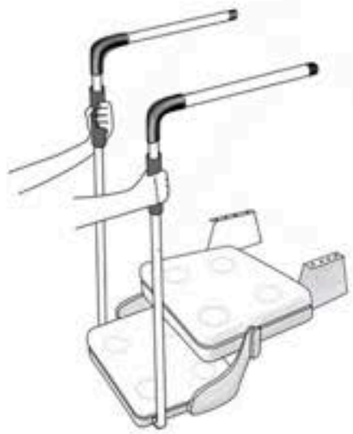
- Addressing some accessibility challenges for getting into the RV.
- Addresses safety concerns relationg to navigating with a mobility impairment.
- Increased lighting for accessibility solution.

10/9/24

CONCEPT

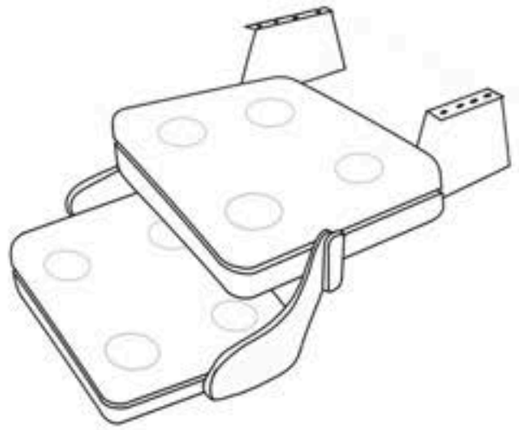




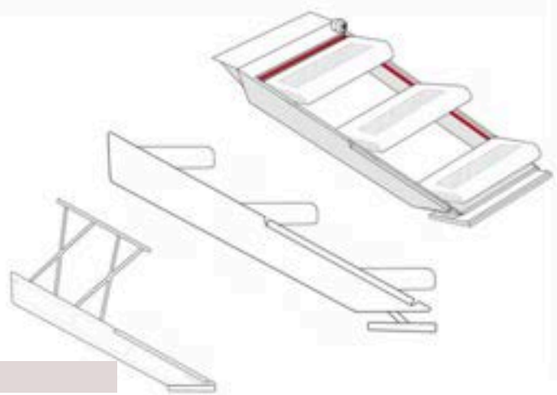


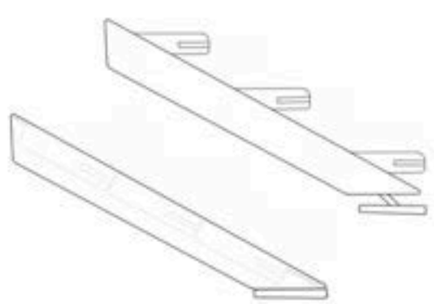
How do rails fold away?

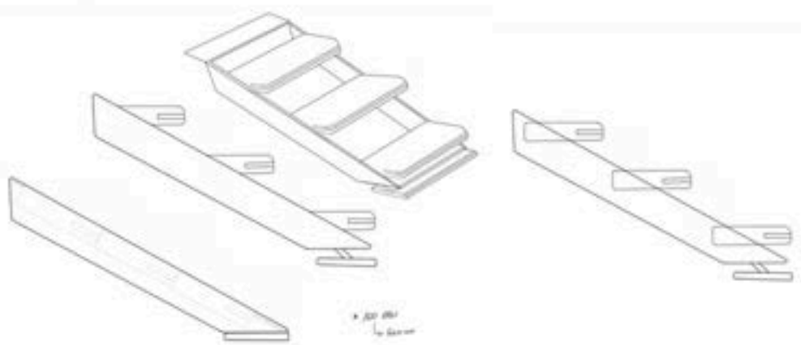
Add to presentation drawing



CONCEPT







SUMARY OF RESEARCH

The objective of the research was to inform the development of a product that aims to **enhance the safety and experience of elderly RV campers with mobility impairments.**

KEY RESEARCH POINTS:

32% AFFECTED BY MOBILITY ISSUES

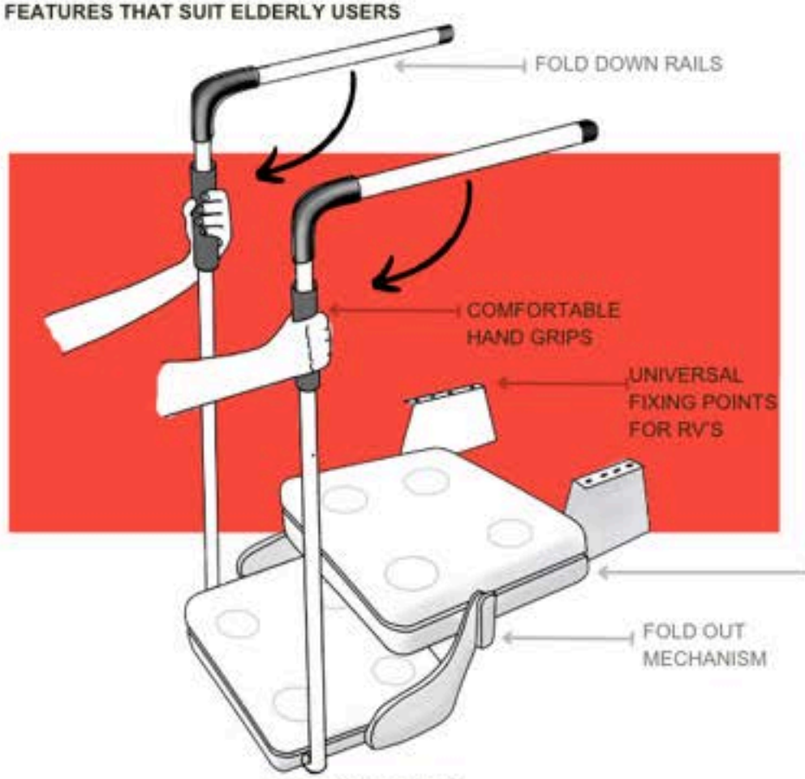
Problem Identified

Elderly RV campers with mild to moderate mobility impairments face significant challenges with safety and accessibility when entering and exiting RVs. Current market solutions often cater to either severe disabilities or none at all, leaving a critical gap for a large segment of elderly users.

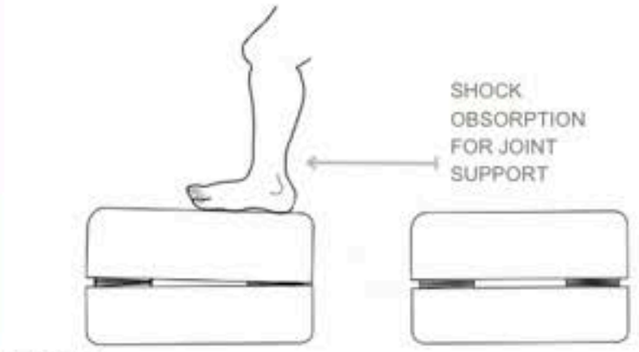
The older a person gets, the more likely they are to experience mobility impairments.

CONCEPT 1: SHOCK ABSORPTION STEPS

- A MORE TRADITIONAL RV STEP DESIGN WITH ENHANCED FEATURES THAT SUIT ELDERLY USERS



HERO VIEW



DETAIL VIEWS

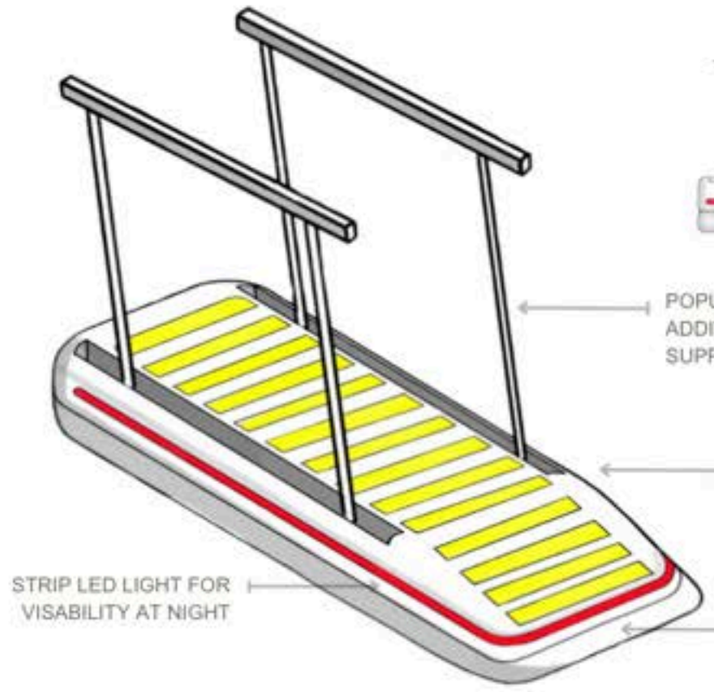
CONTEXT VIEW

HOW IT LINKS TO RESEARCH

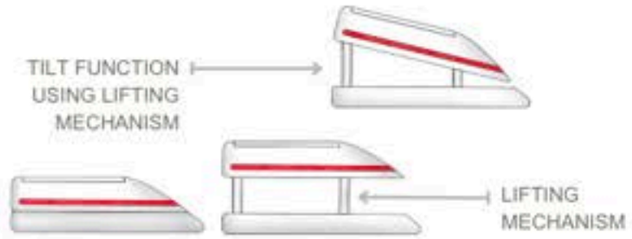
- Accommodate elderly needs in regards to joint support with shock absorption feature - INTERVIEW THEME: ACCESSIBILITY SOLUTIONS
- Accessibility improvements with larger steps and fold out rails that are easily accessible - INTERVIEW THEME: ACCESSIBILITY CHALLENGES
- Accomodate's accessibility challenges due to mobility issues like joint problems - INTERVIEW THEME: ACCESSIBILITY CHALLENGES
- Improves balance with the use of rails and and shock absorption - INTERVIEW THEME: MOBILITY IMPAIRMENTS

CONCEPT 2: LIFT ASSIST RAMP

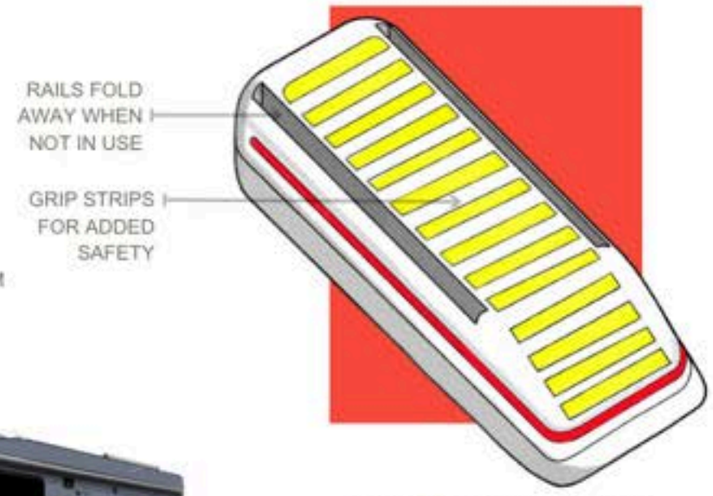
- AN ELECTRONIC LIFT THAT CAN TURN INTO A RAMP ACCOMMODATING ALL TYPES OF MOBILITY IMPAIRMENTS.



HERO VIEW



SIDE VIEWS



ISOMETRIC VIEW (FOLDED)

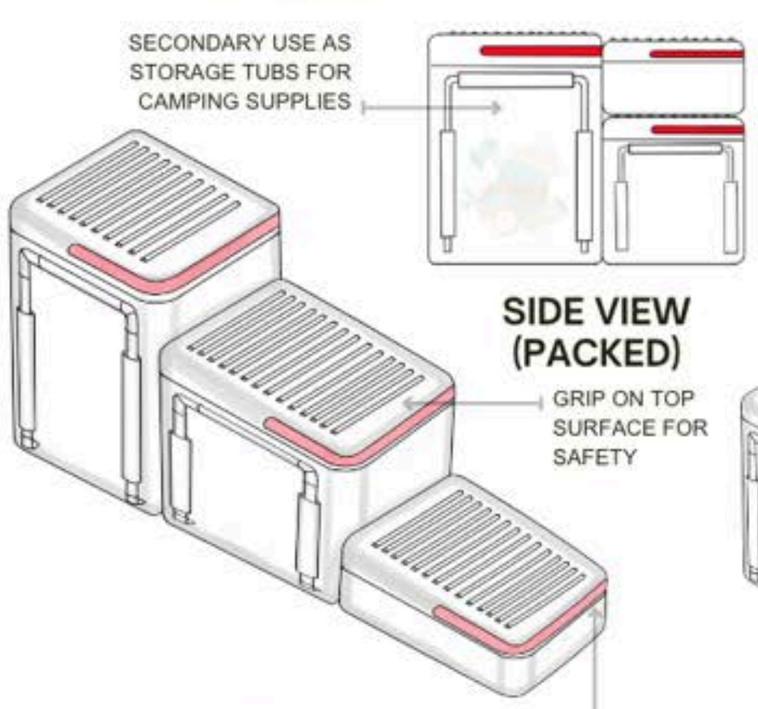
CONTEXT VIEW

HOW IT LINKS TO RESEARCH

- Increased lighting with the external LED lights around the platform - INTERVIEW THEME: ACCESSIBILITY SOLUTIONS
- Accessibility improvement for people with all types of mobility impairments with the use of the ramp and lift feature - INTERVIEW THEME: ACCESSIBILITY CHALLENGES
- Allows for the use of mobility aids due to the use of a ramp - INTERVIEW THEME: MOBILITY IMPAIRMENTS

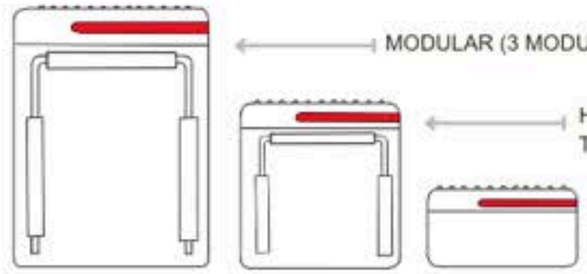
CONCEPT 3: MODULAR STORAGE STEPS

- **A COMPACT MODULAR STEP SOLUTION THAT CAN BE USED FOR STORAGE BUT ALSO HAS MOBILITY ENHANCING FEATURES LIKE POP-UP RAILS.**



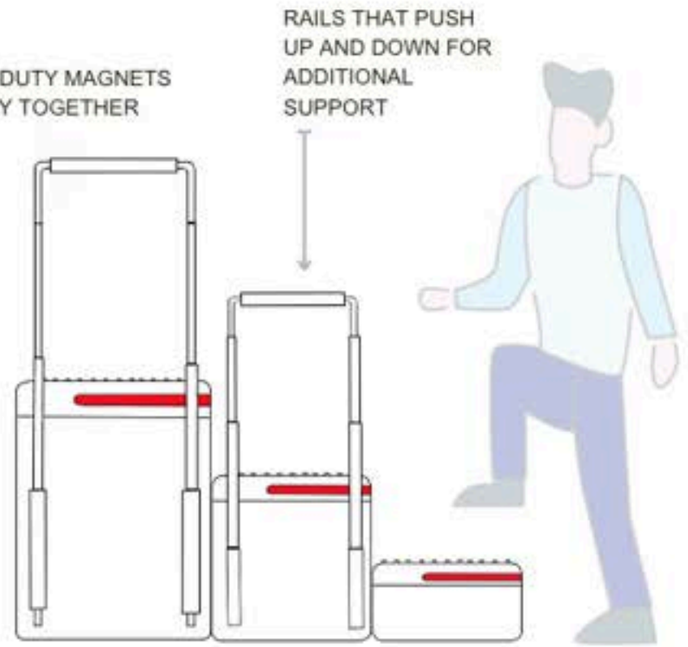
HERO VIEW

SIDE VIEW (PACKED)



SIDE VIEW (SHOWING MODULES)

ISOMETRIC VIEW (PACKED)



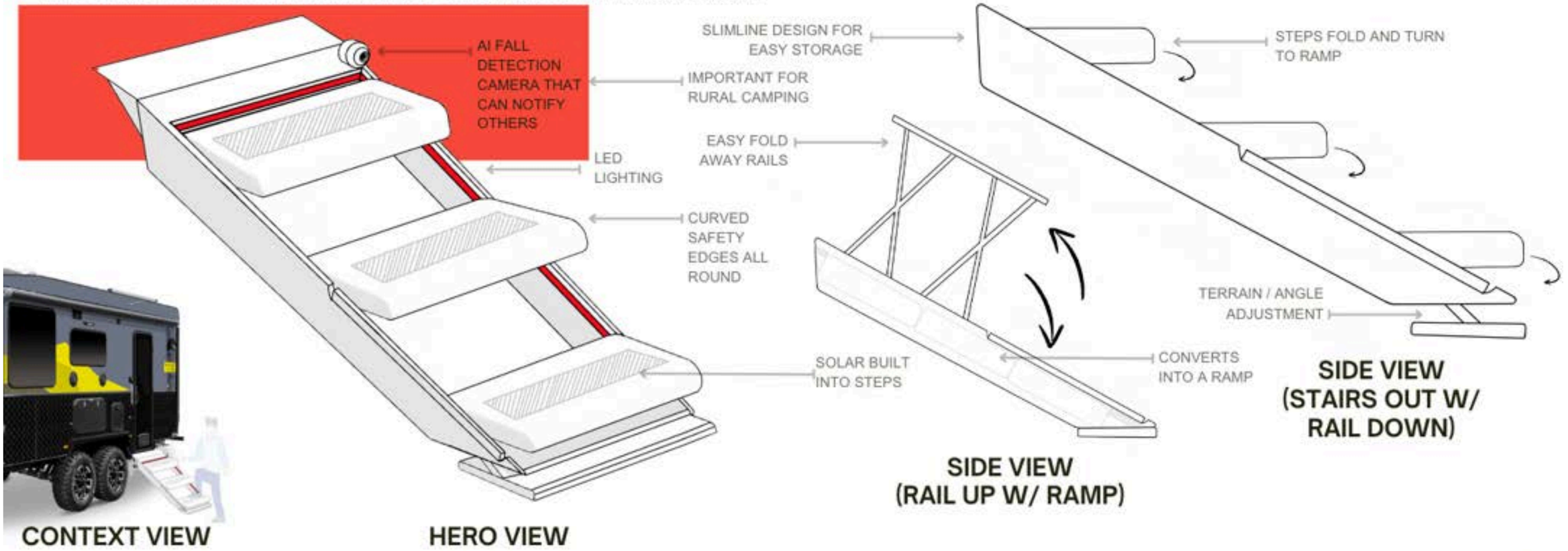
SIDE VIEW (FOLDED OUT)

HOW IT LINKS TO RESEARCH

- **Increase visibility with the external LED lighting - INTERVIEW THEME: ACCESSIBILITY SOLUTIONS**
- **Accessibility improvement with large modular steps and rails - INTERVIEW THEME: ACCESSIBILITY CHALLENGES**
- **Designed to accomodate accessibility challenges caused by mobility issues - INTERVIEW THEME: ACCESSIBILITY CHALLENGES**
- **Secondary use as storage tubs for additional storage which was a selling factor for RV's - SURVEY THEME: STORAGE AS A REASON TO SELL RV**

CONCEPT 4: SMART ASSIST RAMP & STEPS

- **A SMART STEP AND RAMP THAT HAS AI FALL DETECTION, SOLAR-POWERED, TERRAIN ADJUSTABILITY, COMPACT DESIGN ELEMENTS, AND FOLDAWAY RAILS FOR ADDITIONAL SUPPORT.**

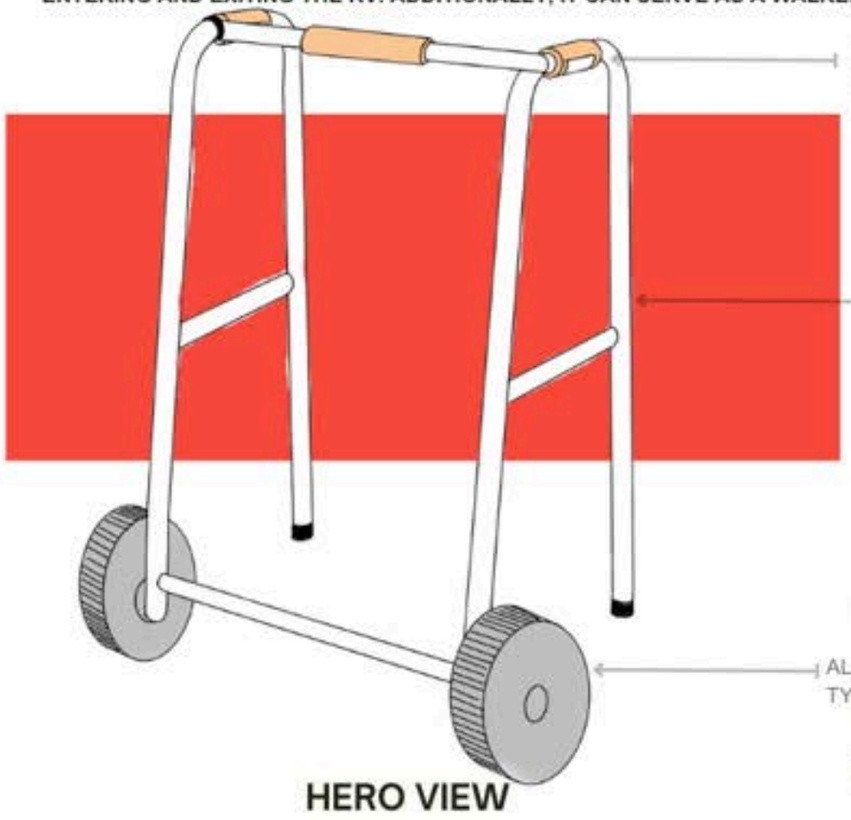


HOW IT LINKS TO RESEARCH

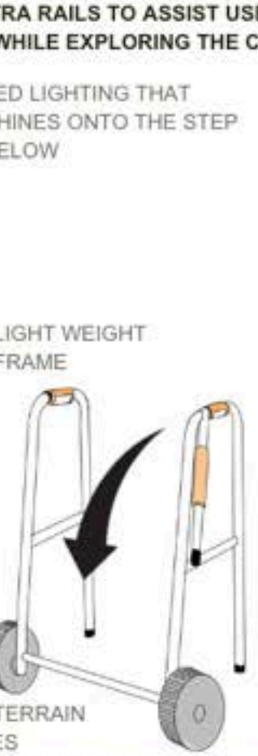
- **Increases visibility with the internal LED lighting - INTERVIEW THEME: ACCESSIBILITY SOLUTIONS**
- **Accessibility improvement with larger more frequent steps that can be changed to a ramp - INTERVIEW THEME: ACCESSIBILITY CHALLENGES**
- **Accomodate's a range of accessibility challenges due to mobility issues - INTERVIEW THEME: ACCESSIBILITY CHALLENGES**
- **Can potentially accomodate the use of mobility aids with the ramp - INTERVIEW THEME: MOBILITY IMPAIRMENTS**

CONCEPT 5: RV ASSIST WALKER

- A WALKER DESIGNED TO COMPLEMENT STANDARD RV STEPS, PROVIDING EXTRA RAILS TO ASSIST USERS WHEN ENTERING AND EXITING THE RV. ADDITIONALLY, IT CAN SERVE AS A WALKER WHILE EXPLORING THE CAMPGROUND.

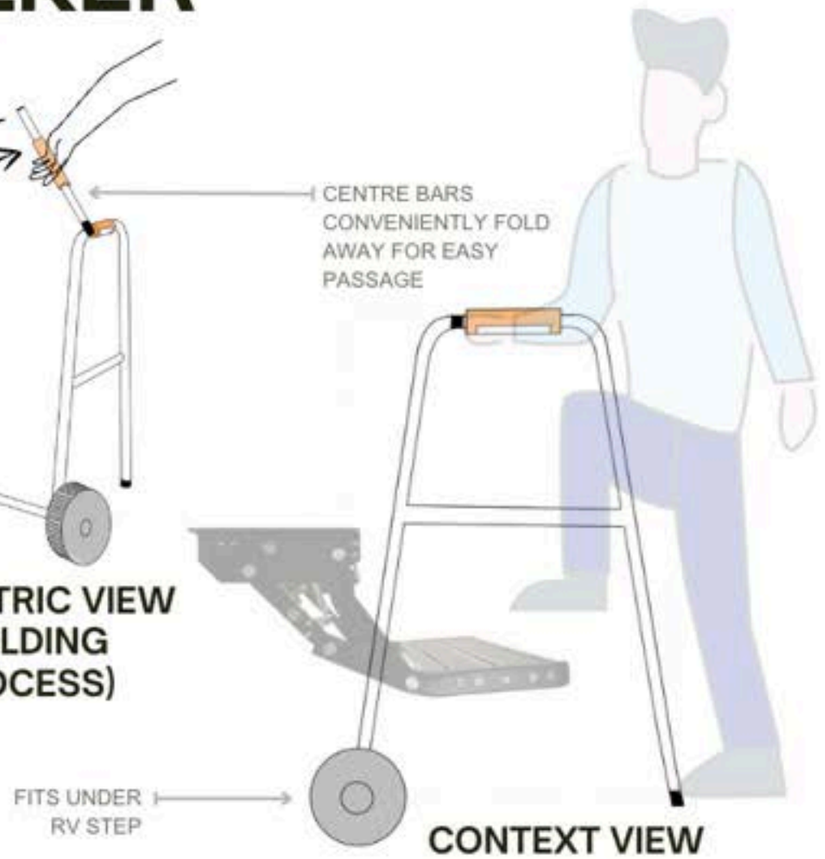


HERO VIEW



ISOMETRIC VIEW (READY FOR STEP)

ISOMETRIC VIEW (FOLDING PROCESS)



CONTEXT VIEW

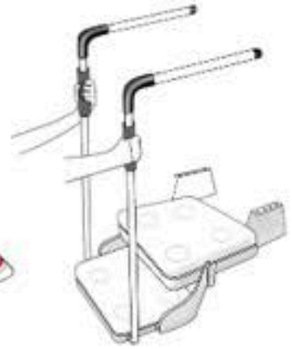
HOW IT LINKS TO RESEARCH

- Accomodate's accessibility challenges due to mobility issues - INTERVIEW THEME: ACCESSIBILITY CHALLENGES
- Allows for individuals that use a walker mobility aid to enter and exit and RV - INTERVIEW THEME: ACCESSIBILITY CHALLENGES & INDERPENDANCE AND QUALITY OF LIFE
- Increase visibility with the external LED lighting on the top of the walker - INTERVIEW THEME: ACCESSIBILITY SOLUTIONS

CONCEPT SELECTION

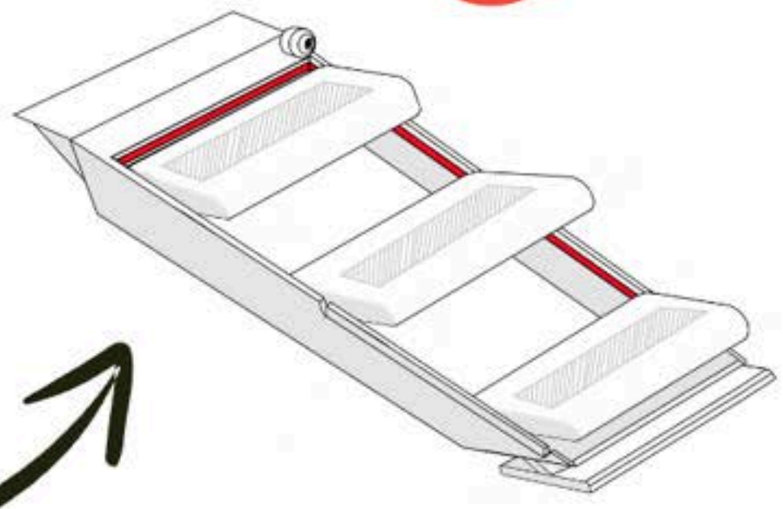
1

2



3

4



5

CHOSEN DIRECTION

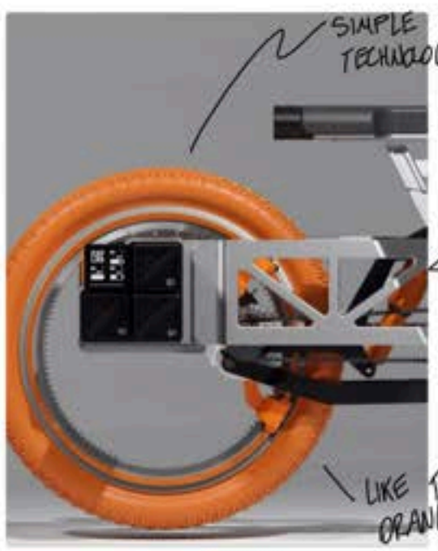
CONCEPT 4: SMART ASSIST RAMP & STEPS

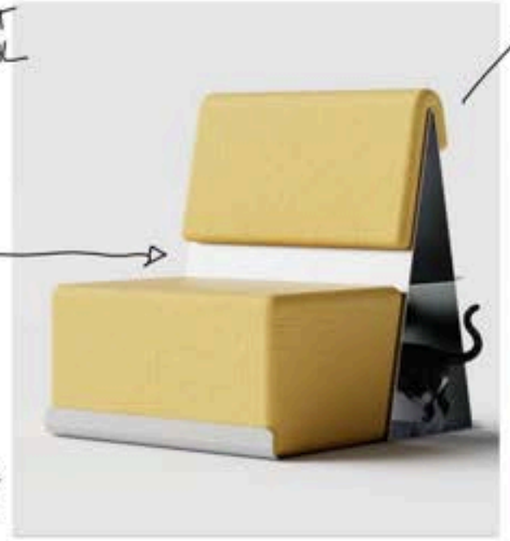
A SMART STEP AND RAMP THAT HAS AI FALL DETECTION, SOLAR-POWERED, TERRAIN ADJUSTABILITY, COMPACT DESIGN ELEMENTS, AND FOLDAWAY RAILS FOR ADDITIONAL SUPPORT.

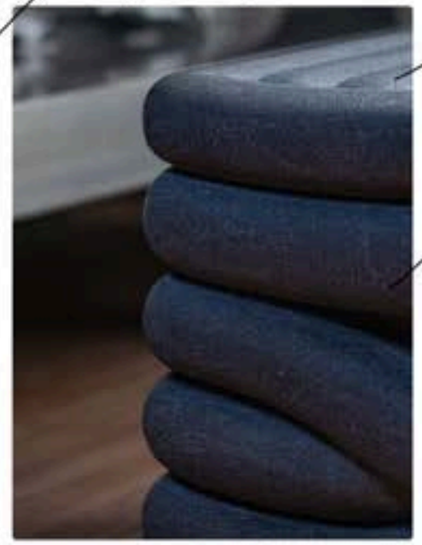
FUTURE DEVELOPMENT

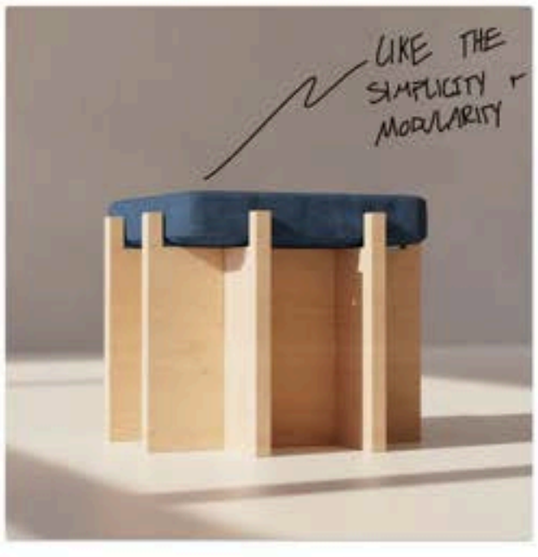
- ERGONOMICS
- AESTHETICS + CMF
- DMF
- SUSTAINABILITY
- UX
- MODULARITY

MOOD BOARD





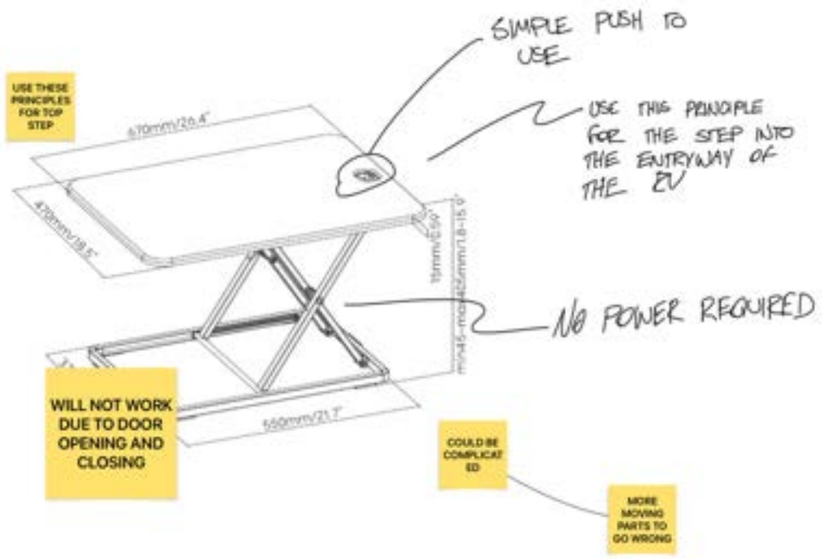




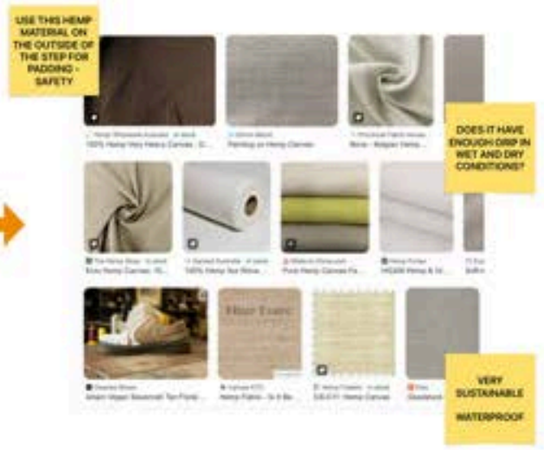
10/9/24

TOP STEP MECHANISM IDEATION

23/09/2024

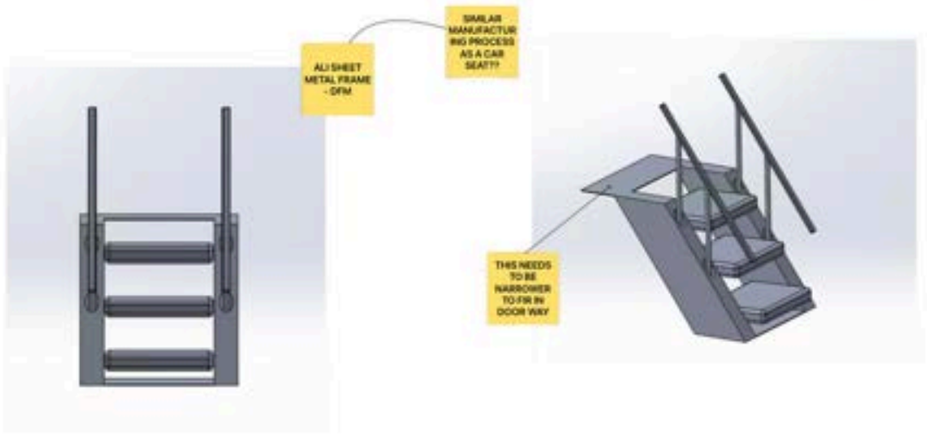


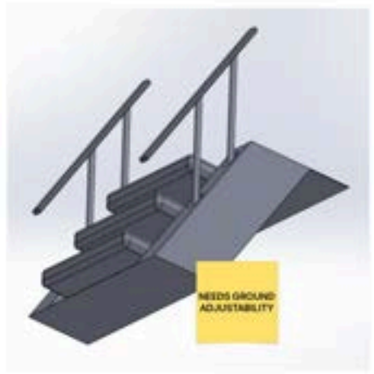
AESTHETICS INSPIRATION



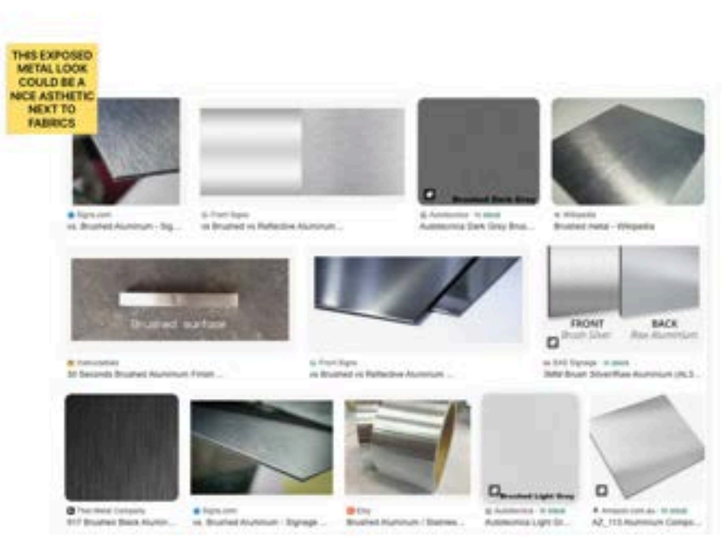
INITIAL CAD IDEATION

26/09/2024





FINISHES/MATERIAL

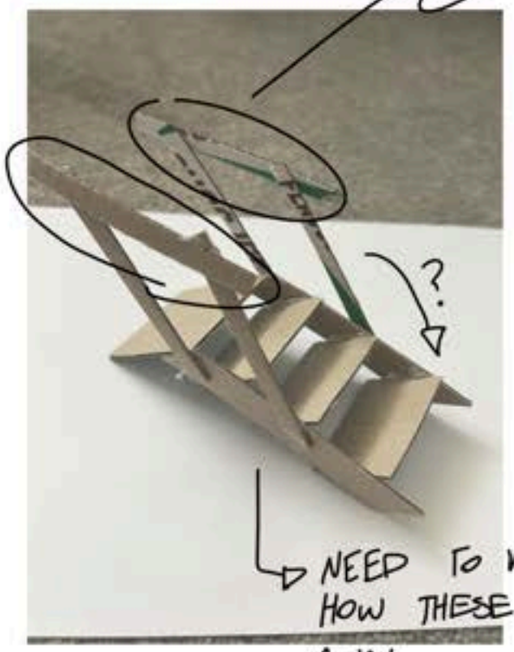


DEBRIEF SO FAR 30/9/24

- A 3 tier RV step that can be used as steps or turns into a walk ramp.
- Manufactured from lightweight materials - composites / aluminium.
- Technology: AI fall detection camera that is fitted into on of the steps.
- Modular so that the technology aspect is optional - swap out step/module.

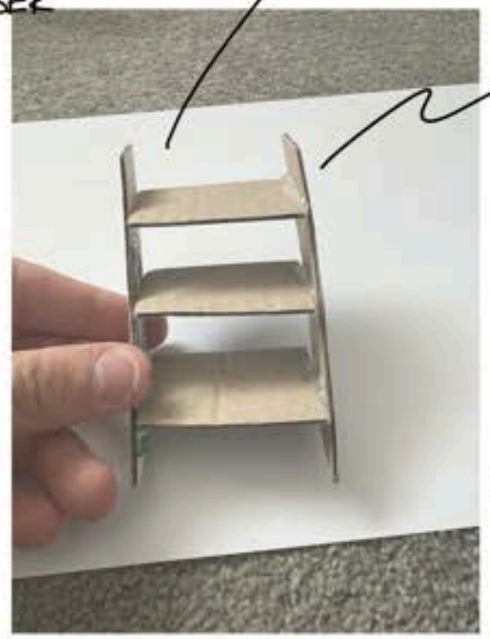
5. Recycled Carbon Fiber Composites

- **Material**: Recycled carbon fibers blended with polymers (e.g., epoxy, polyester).
- **Benefits**: Extremely lightweight and strong. Using recycled carbon fiber reduces the environmental impact associated with carbon fiber production.
- **Use Case**: Ideal for high-performance, lightweight RV steps that need to support heavier loads.



LOTS OF SUPPORT FOR THE USER

NEED TO WORK OUT HOW THESE FOLD AWAY



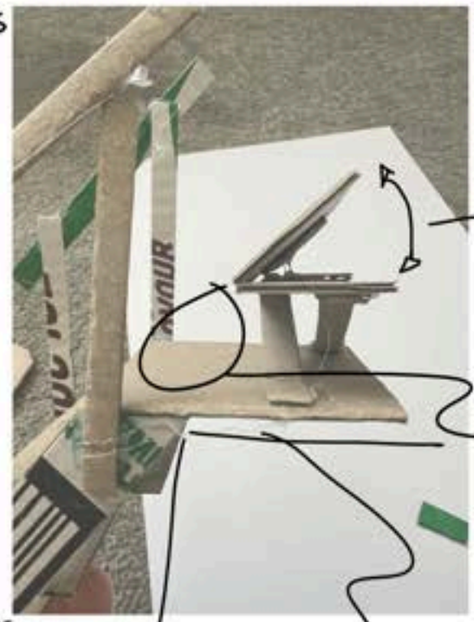
SHEET METAL FABRICATION ?

HOW DO THE STEPS STAY IN THE RIGHT POSITION

AND CHANGE INTO RAMP POSITION

STEPS

RAMP

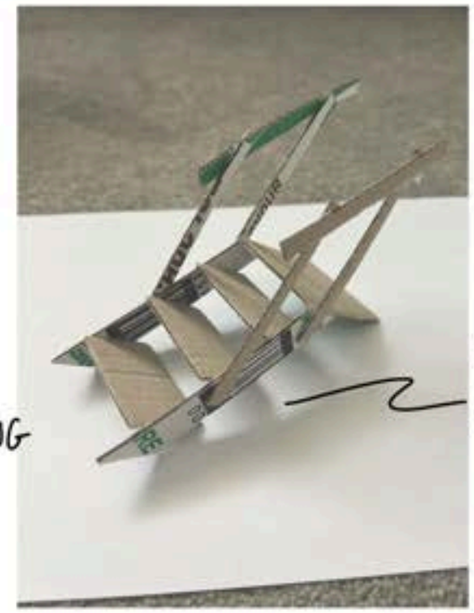


FOLDS UP AND DOWN FOR RAMP

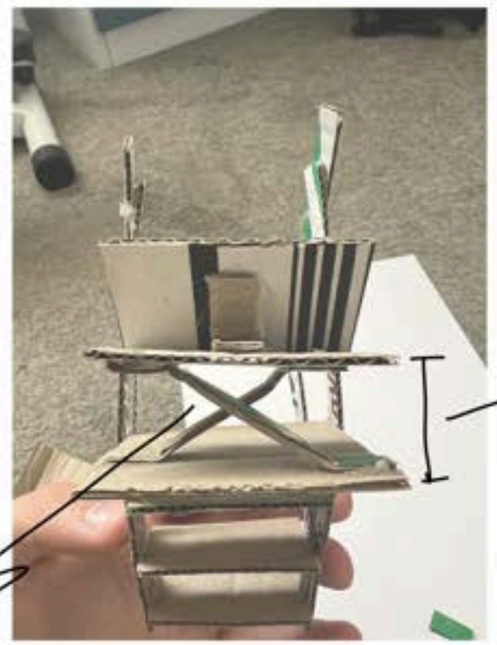
LARGE GAP THE IS NOT ACCOUNED FOR

RESTS IN POSITION ON INTERNAL RV STEP

* LIKING THE FAMILIAR FORM - GREAT FOR USERS
* NEEDS CURVED SAFETY EDGES
* TOP RAMP NEEDS DEVELOPMENT AND FURTHER PROTOTYPING



OVERALL FORM IS FAMILIAR TO USERS

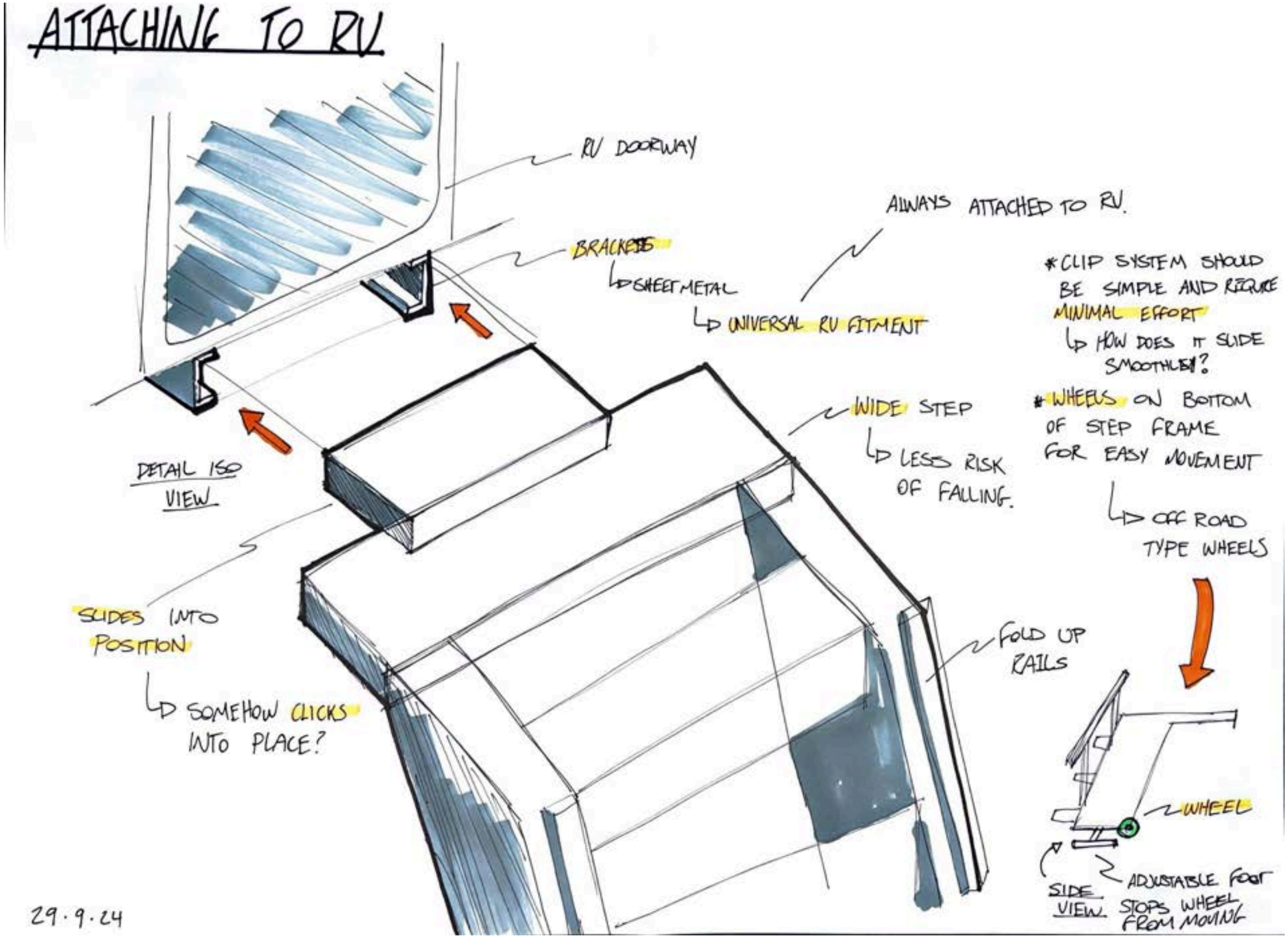


FOLDS UP AND DOWN

TOO MANY MOVING PARTS?

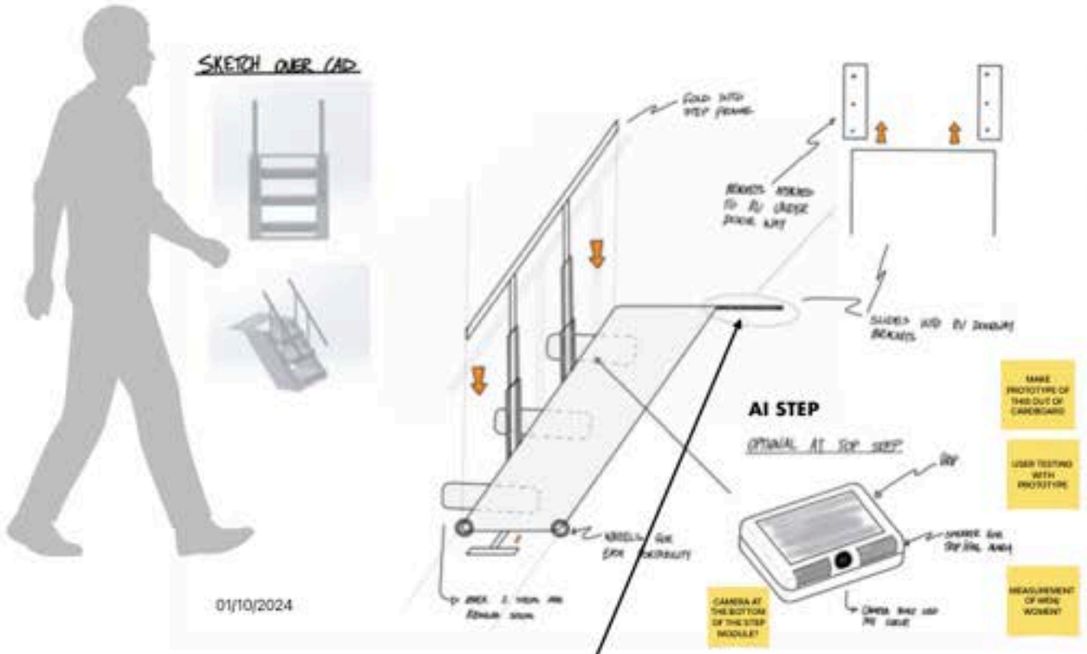
FOR INTERNAL STEP

ATTACHING TO RV



29.9.24

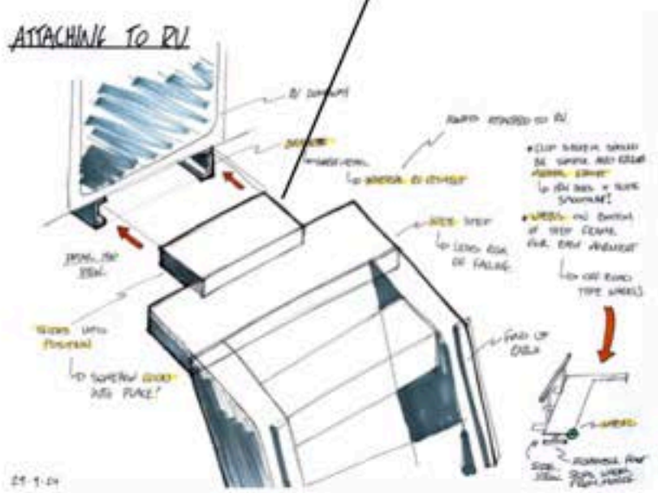
CAD DEVELOPMENT/ SKETCH OVER

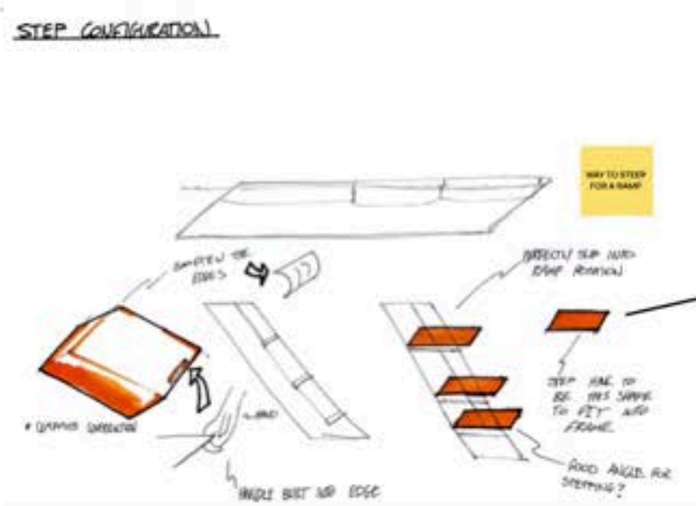


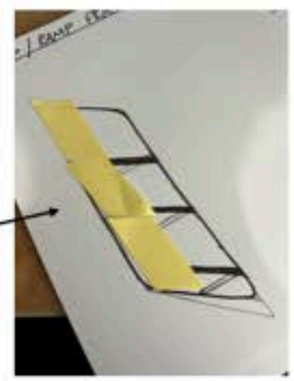
* COMPOSITE MATERIALS FOR STEP MODULES → LIGHTWEIGHT CONSTRUCTION
* ALL INTERNAL FRAME FOR STEP FRAME

* COULD THE 1 INTERNAL AS STEP BE THE ONLY PART THAT IS POWERED?
  ↳ HAS A LIGHT THAT CAN LIGHT UP THE ENTIRE STEP

ATTACHMENT BRACKET



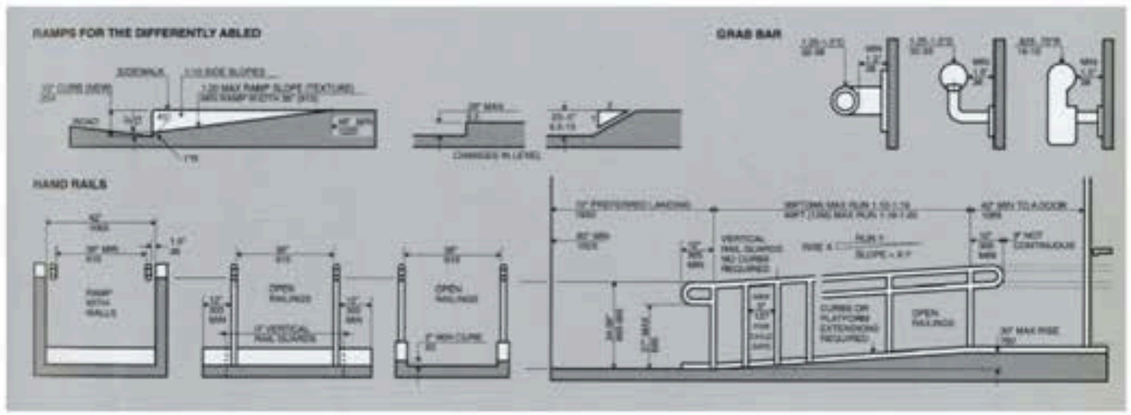


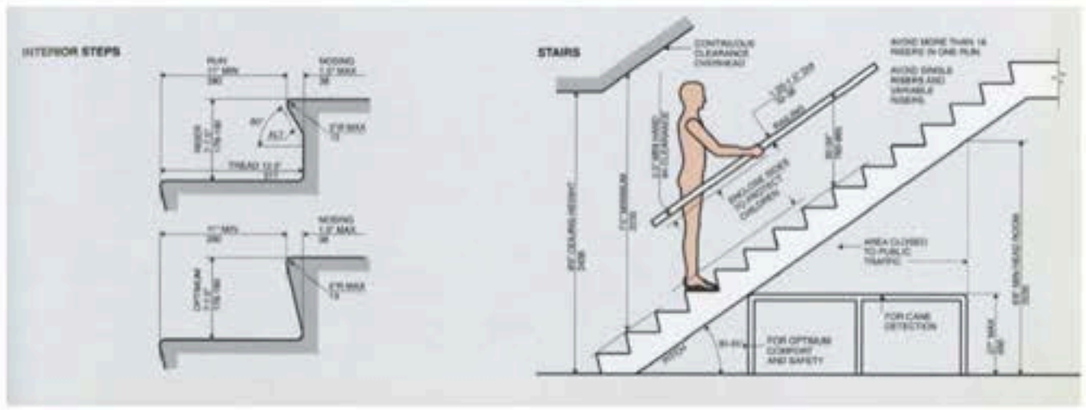


HCD

MIN RAMP WIDTH: 915mm

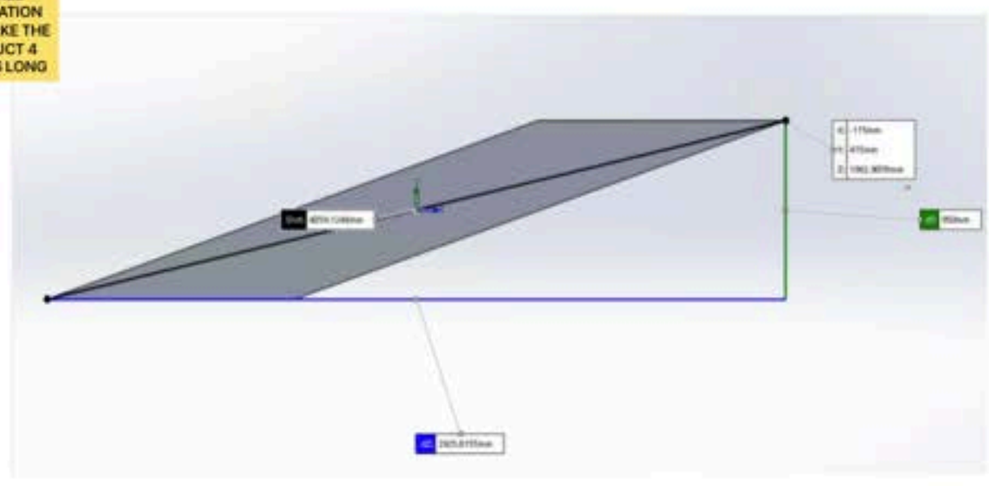
MAX SLOPE WITH TEXTURE: 20 DEGREES





RAMP WITH 20 DEGREE INCLINATION WILL MAKE THE PRODUCT 4 METERS LONG

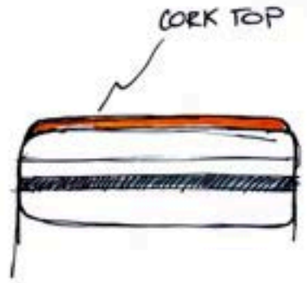
TOO LONG FOR ELDERLY TO USE AND STORE

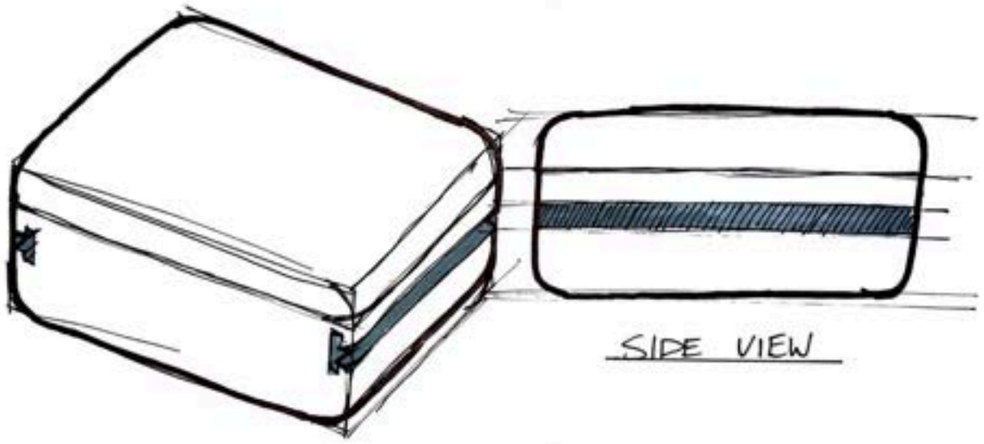


Rather than focusing on a ramp function - focus on making the step as suited to the user group as possible

- Hand rails
- Step design
  - Size of step
  - Non-slip surfaces
- Shock absorption
- AI fall detection alarm system

STEP DEVELOPMENT



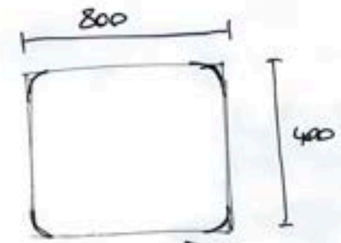


SIDE VIEW

ISOMETRIC VIEW

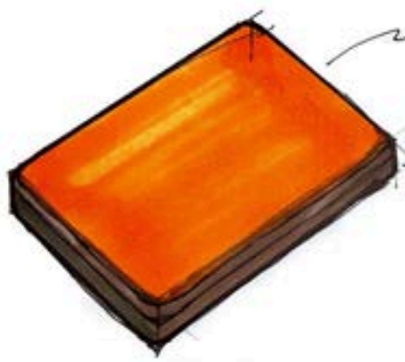
10·10·24

STEP MODULE

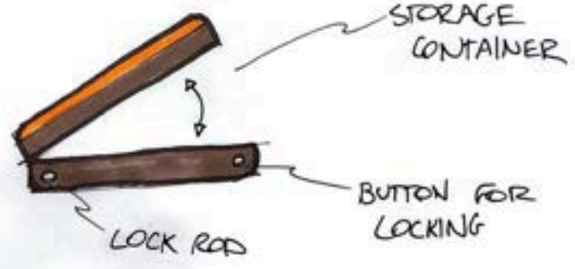


TOP VIEW

FRONT



ISO VIEW

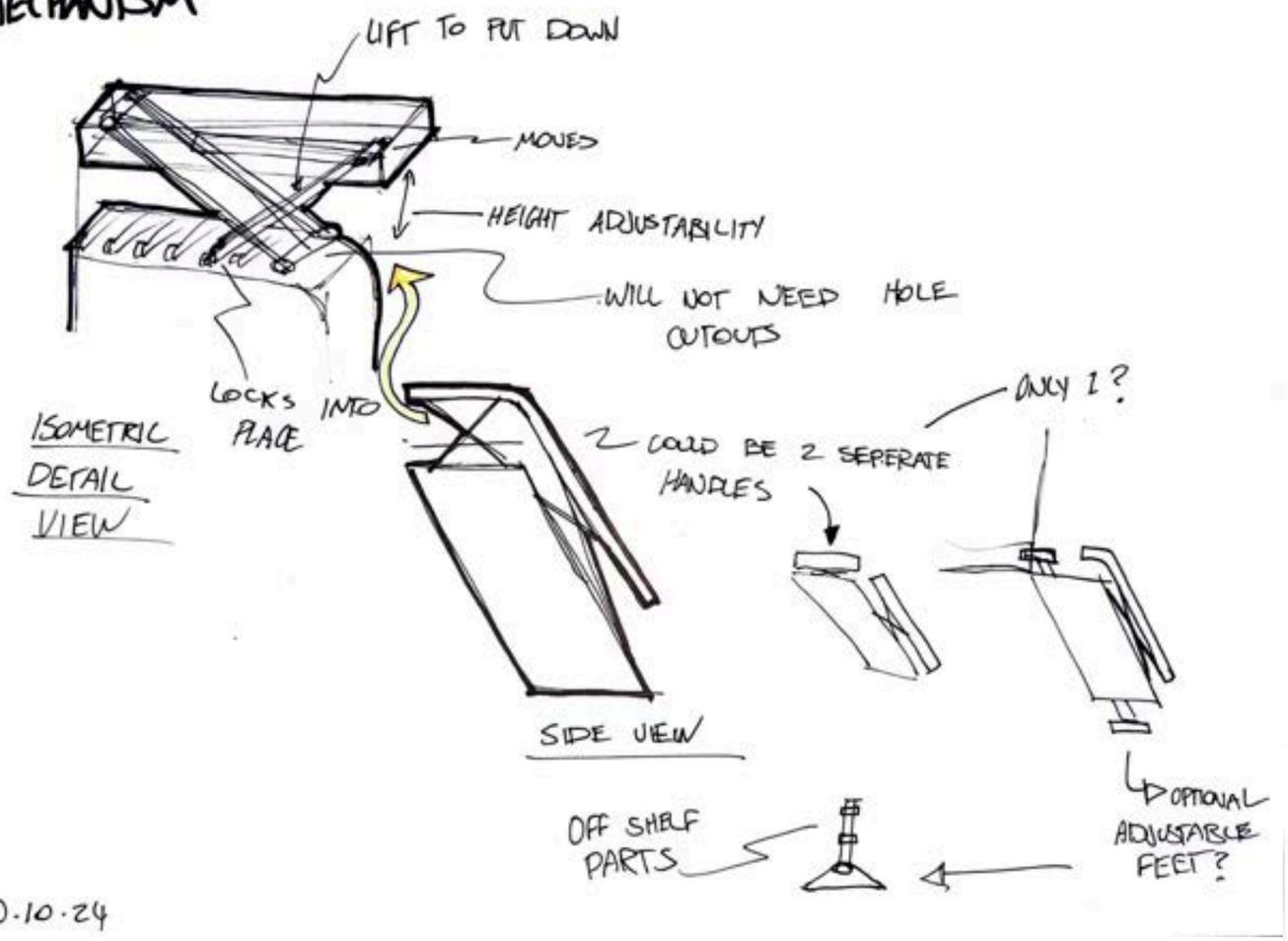


SIDE VIEW

* COULD THE STEPS BE STORED IN SIDE FRAME

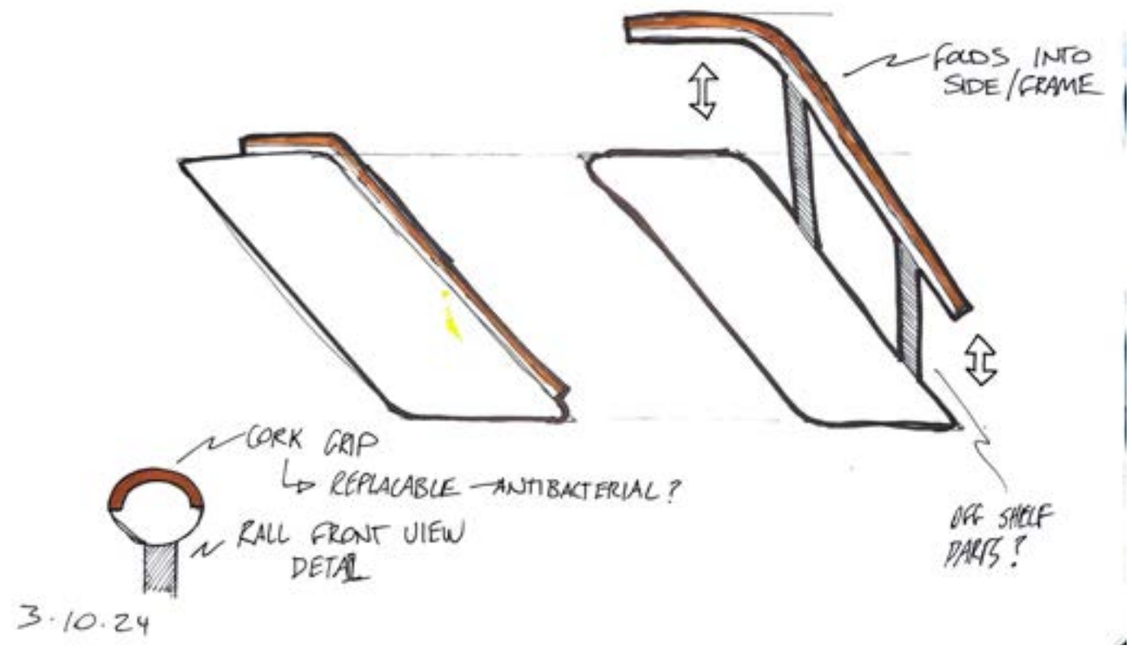
3·10·24

MECHANISM



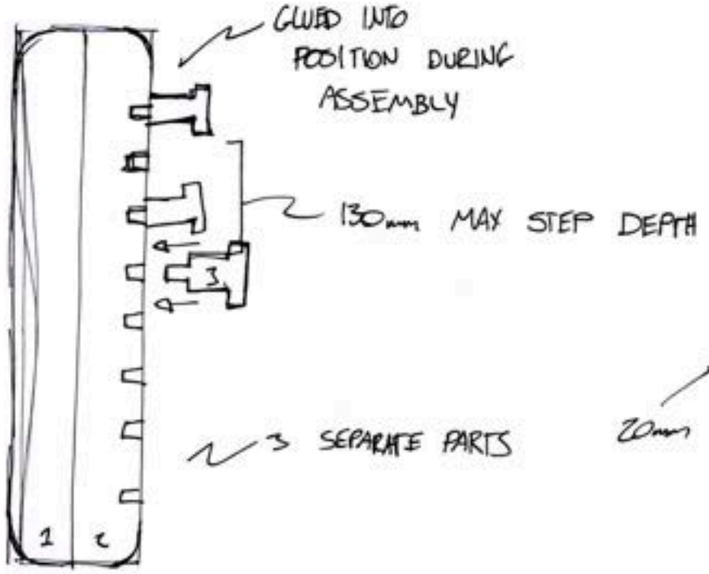
10.10.24

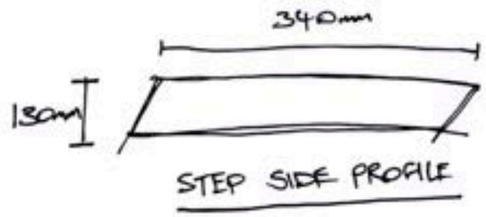
RAILS

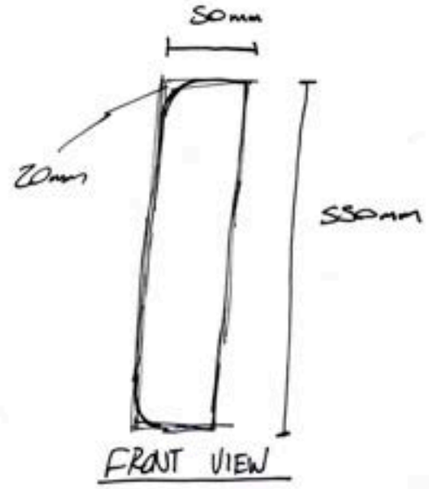


3.10.24

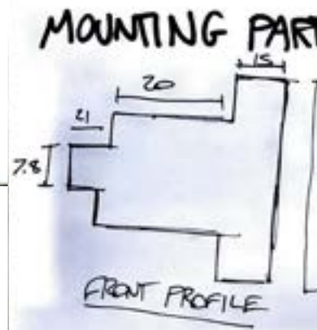
FRAME

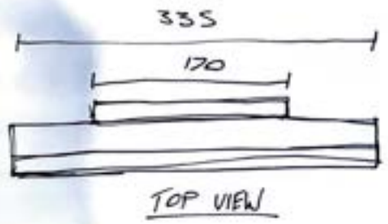


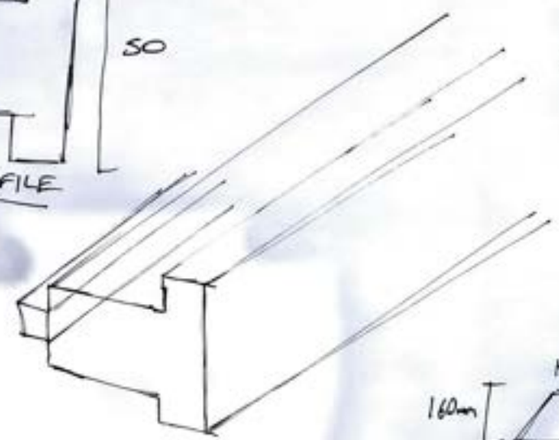


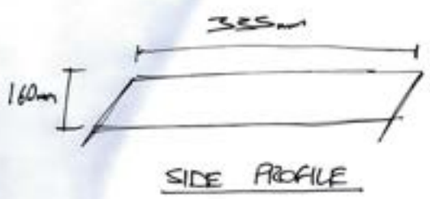


MOUNTING PART

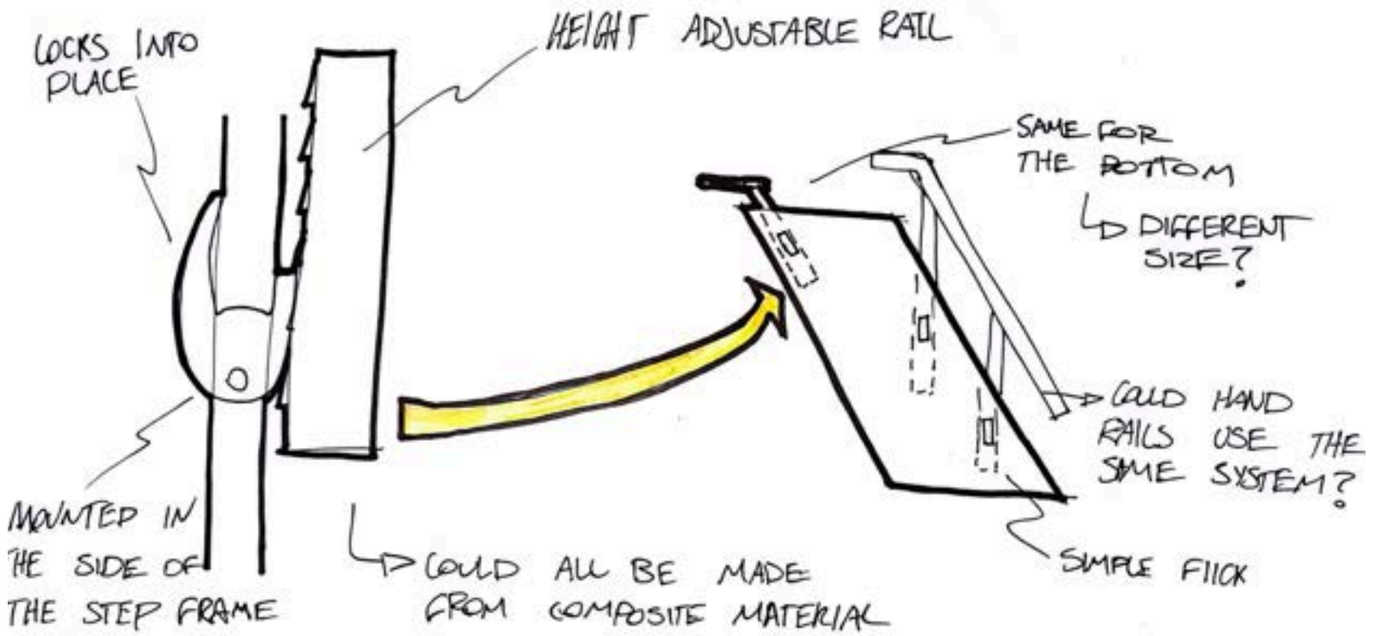








MOUNTING RAILS

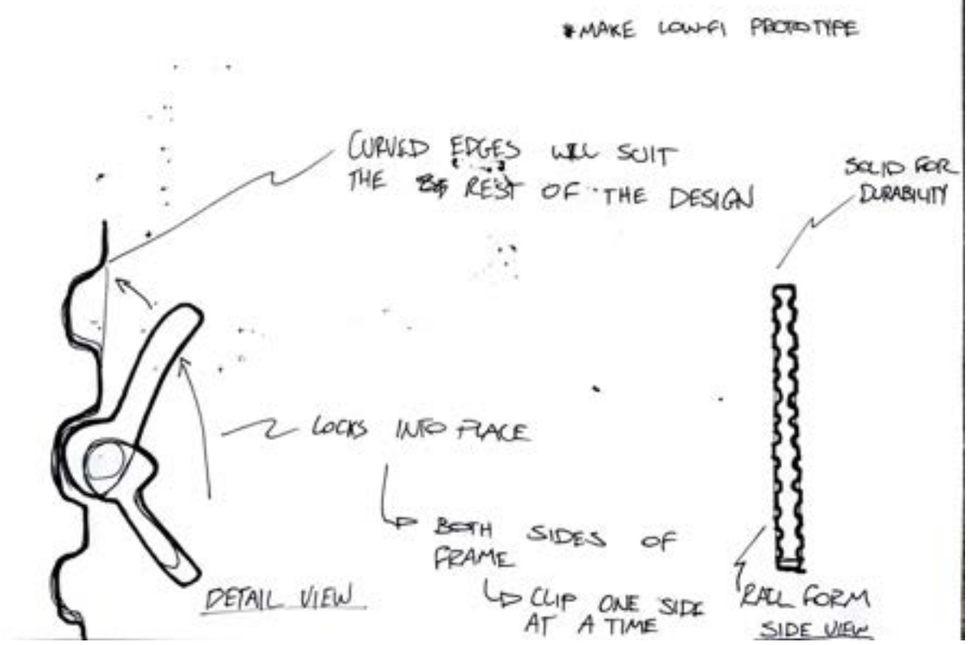


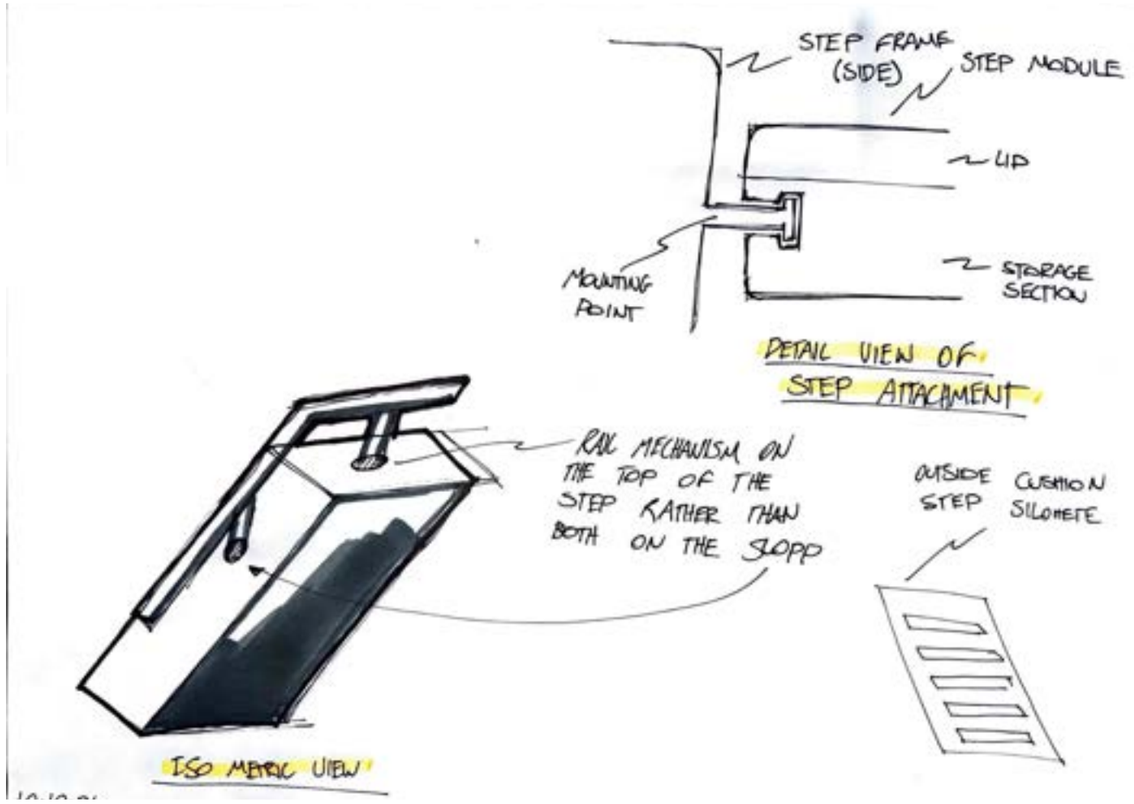
FRONT DETAIL VIEW

↳ OR METAL FOR STRENGTH + DURABILITY

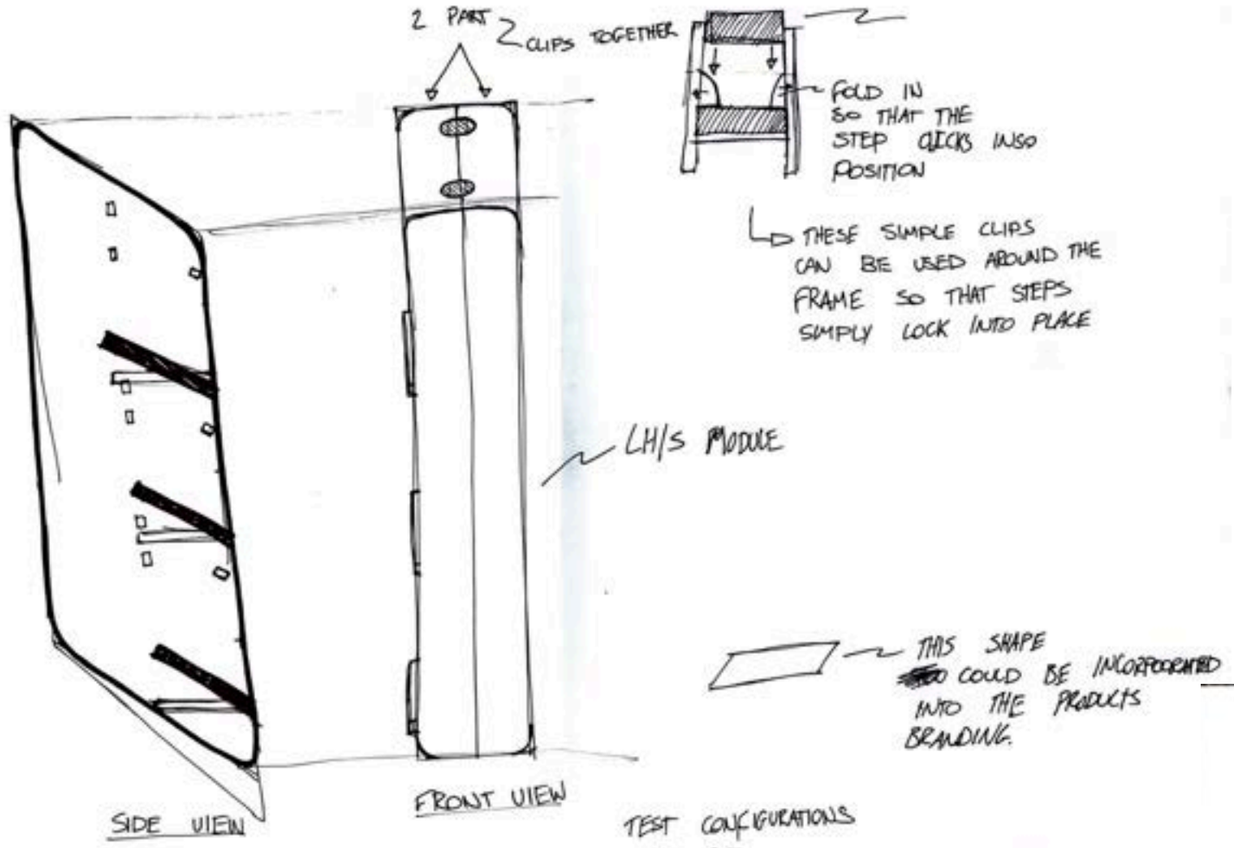
* 3D PRINT PROTOTYPE

LOCKING MECHANISM



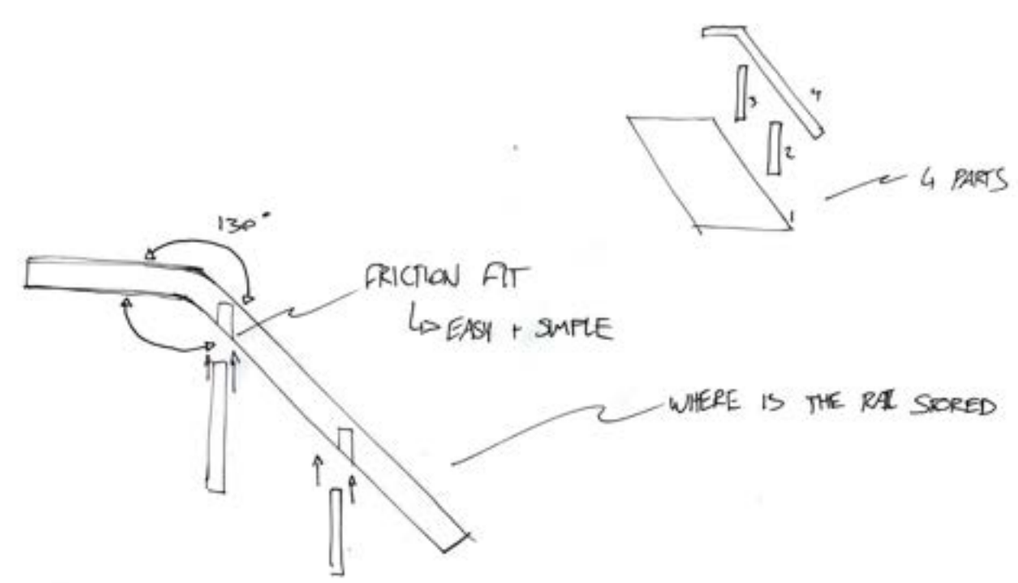


STEP / RAMP FRAME

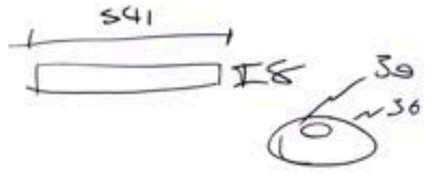


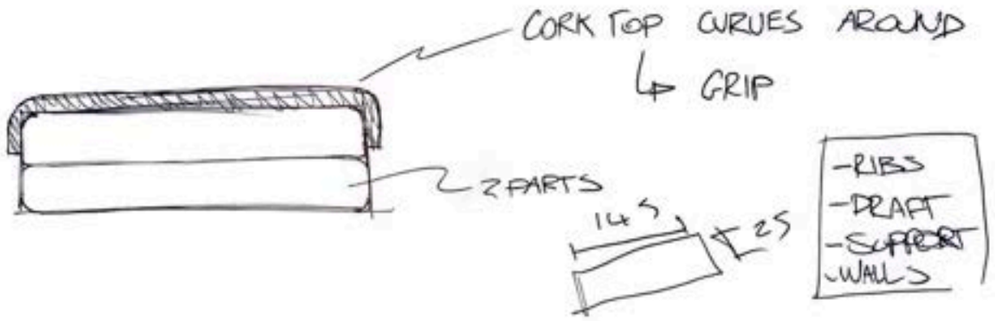
TEST CONFIGURATIONS IN CAD.

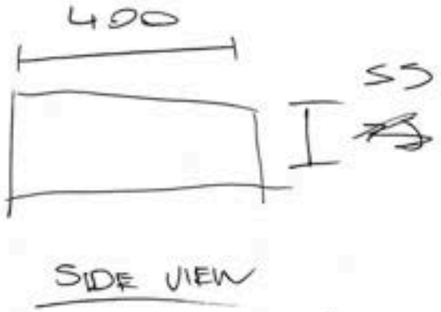
* RAIL COULD BE MODULAR
  - SIMPLY CLIP TOGETHER
* USE OFF SHELF RAILS.

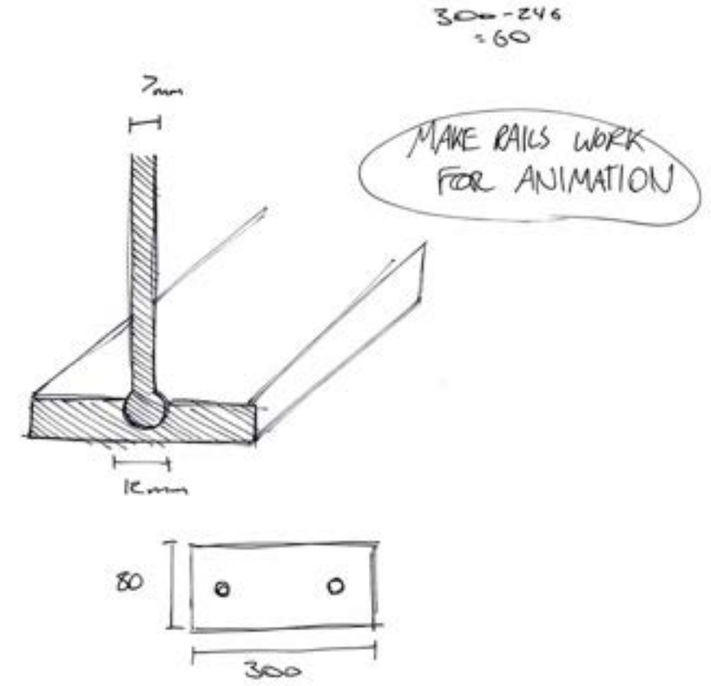


RH SIDE FRAME ASSEMBLY

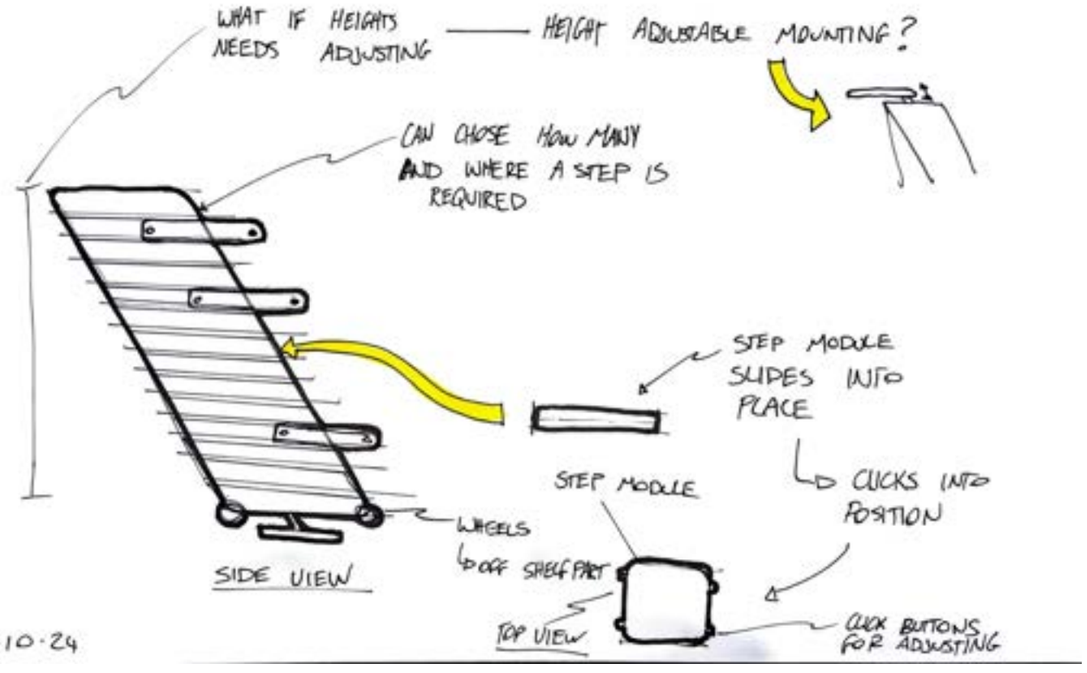




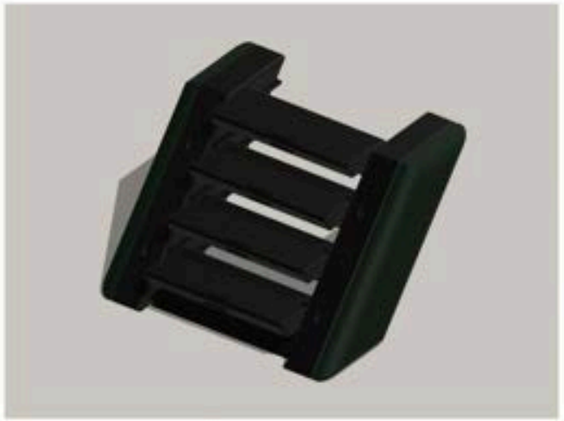


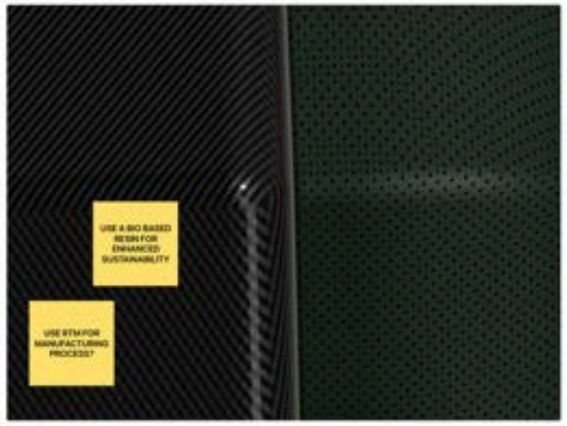


FRAME

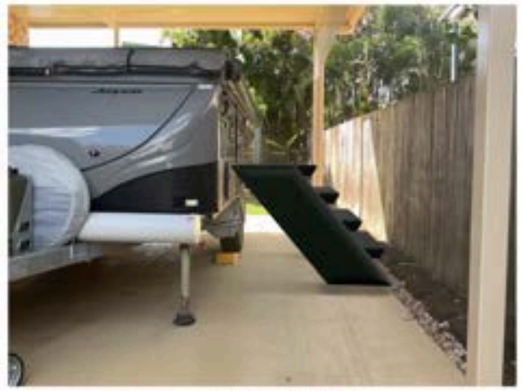


AESTHETICS TESTING

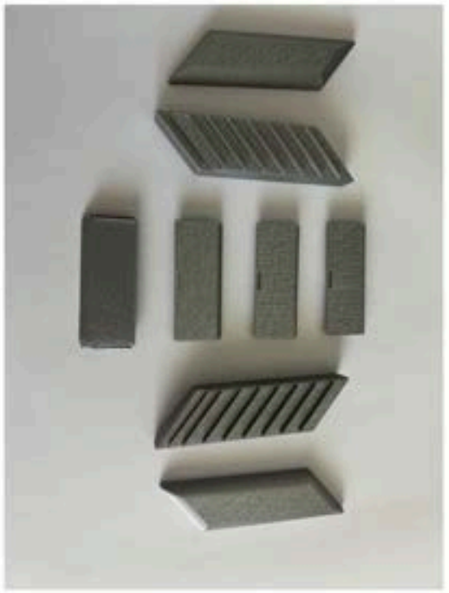




AUGMENTED REALITY PROTOTYPING



3D PRINTED PROTOTYPE



LOW-FI PROTOTYPING

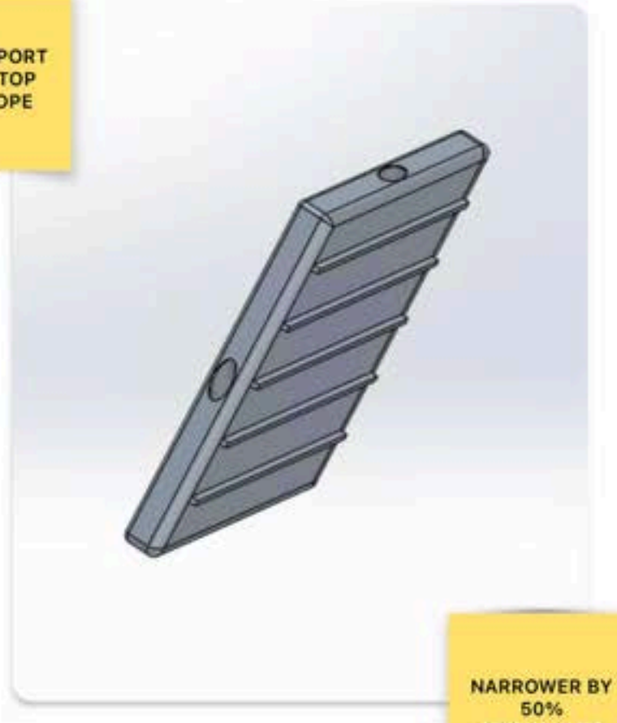
MEASUREMENT

The Boon Step – Rundown

- A step designed for elderly people that are impacted my minor mobility impairments like arthritis.
- AI Smart step module that uses AI technology to recognise a fall. Once a fall is recognised it sounds a loud emergency alarm to surrounding campers for help. The step also has a bright light built in that lights up the below steps for clear visibility at night.
- Steps have a secondary use of storage. - link to research
- Modular construction for easy assembly. – with elderly people in mind.
- Lightweight composite construction – recycled carbon fibre composite using eco-friendly mix.
- Fold out rails for additional support for accessing the RV and trip prevention.
- Shock resistant step using cork material for joint support and arthritis in mind. – eco-friendly, natural grip, shock absorbent, aesthetic.
- External padding for any accidental running into. – foam padding upholstered in a UV resistant and waterproof material.

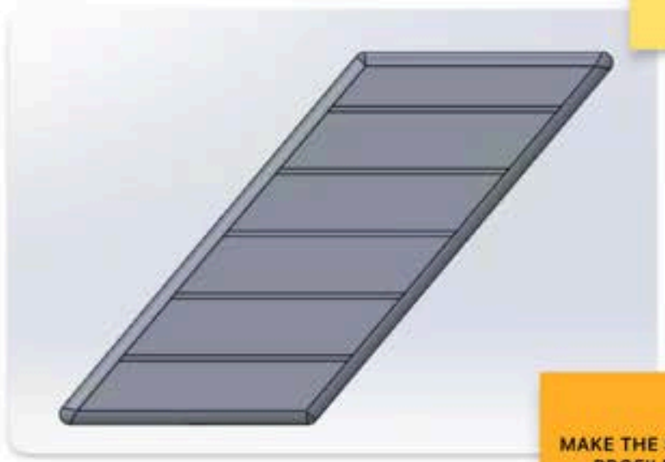
CAD DEVELOPMENT

RAIL SUPPORT ON THE TOP AND SLOPE



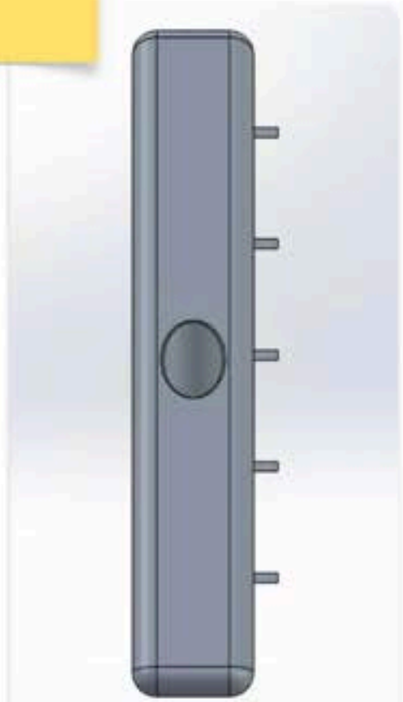
NARROWER BY 50% 100MM WIDE

550MM IN HEIGHT



MAKE THE SIDE PROFILE THINNER?

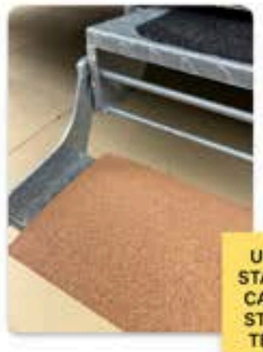
100MM WIDE



DESIGN DEVELOPMENT

#1 Valuable: What is the value for users (beyond the product itself?)
#2 Innovative: Why innovative? (novel tech, sustainable, materials, etc)
#3 Purposeful: What does it do for users? Does it serve a key purpose?
#4 Functional: What are it's key functions? Does it perform these well?
#5 Usable: Is it usable / accessible for intended users?
#6 Enjoyable: Does it fit people's lives, is it enjoyable and experiential?
#7 Manufacturable: Can it be made and fabricated?
#8 Detailed: Have you considered the final touches?
#9 Presentable: Do you have a convincing presentation?

CORK MATERIAL TESTING FOR STEP GRIP



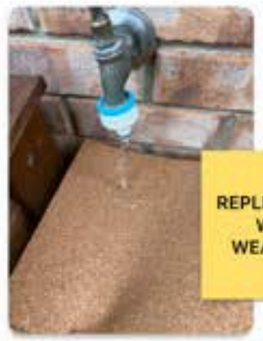
USING A STANDARD CARAVAN STEP FOR TESTING

TESTING THE MATERIAL DRY

LOTS OF GRIP EVEN WITH RUBBER SHOES

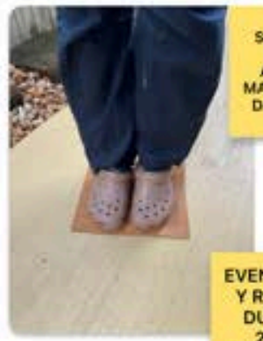
MIMICKING HALF STEPPING

USER DID NOT FEEL LIKE SHE WAS GOING TO SLIP



REPLICATING WET WEATHER

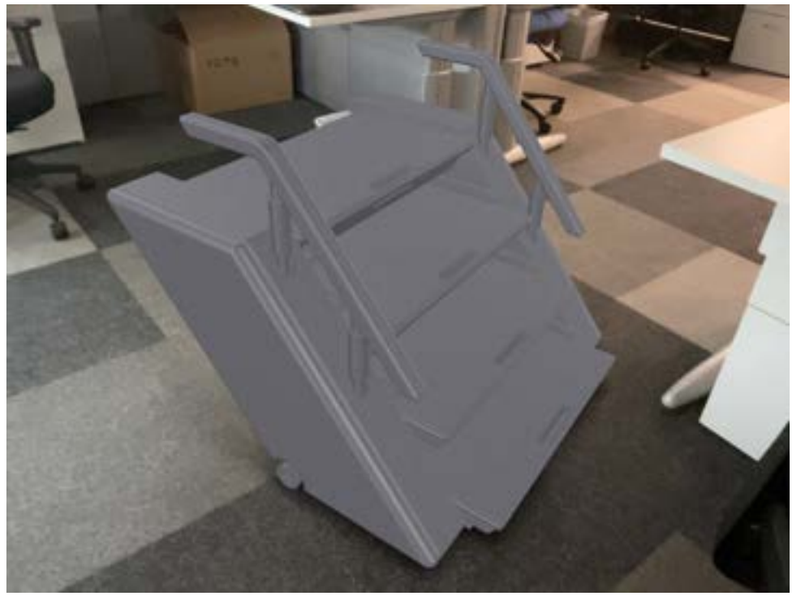
USER STILL DID NOT FEEL LIKE SHE WAS GOING TO SLIP



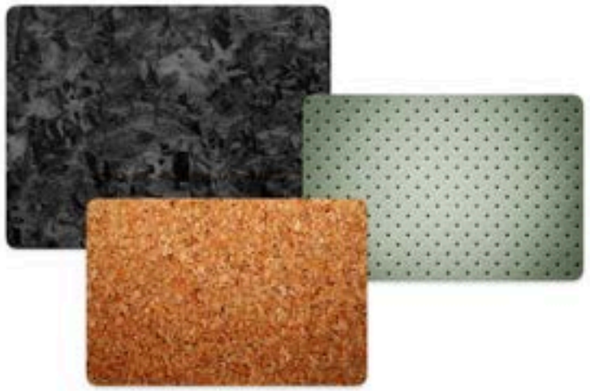
SCRAPING FEET AGAINST MATERIAL TO DAMAGE IT

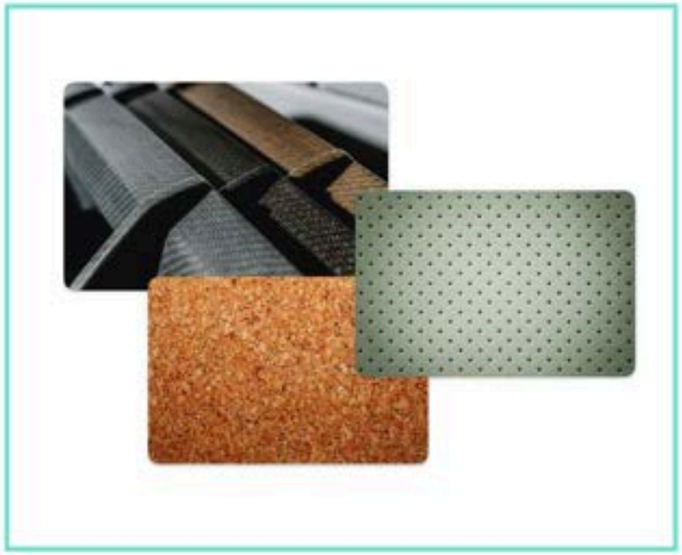
EVENTUALLY RIPPED DUE TO 2MM THICKNESS

AUGMENTED REALITY TESTING



MATERIAL IDEATION





PVC/PMI Foam Core

DO THIS FOR THE FRAME OF THE STEPS

HELP WITH STRUCTURAL RIGIDITY

Core sandwich construction is a lightweight yet high-strength manufacturing technique, commonly used in aerospace, automotive, marine, and sports industries. This construction combines thin, strong face sheets (like carbon fiber or fiberglass) with a lightweight core material to create a stiff, durable structure without significantly increasing weight.

Why Use Composite Sandwich Panels?

derkaero.com

Inside F1's first-ever recycled carbon fib...

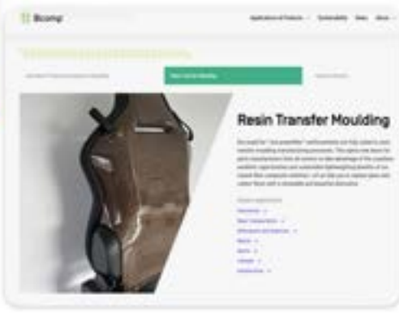
youtube.com

Carbon Fiber Construction - /INSIDE KD...

youtube.com

EVEN MORE SUSTAINABLE ALTERNATIVE TO REGULAR CARBON

bcomp.com



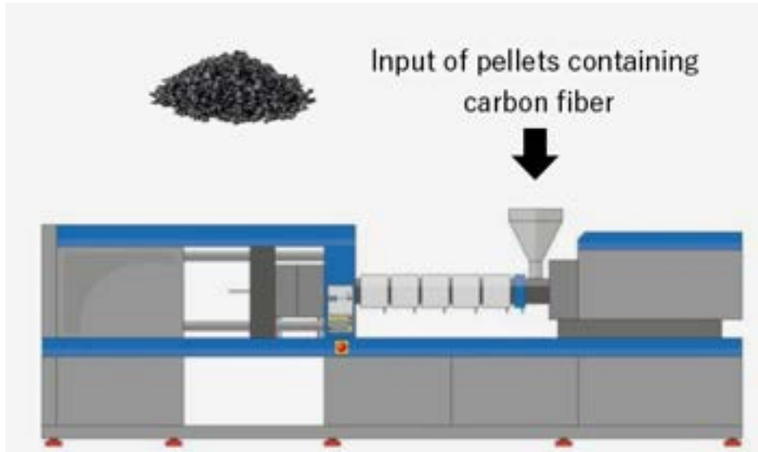
LIKE THE LOOK OF THIS FINISH

AUGMENTED REALITY TESTING

Carbon fiber-reinforced polymer (CFRP) is **a composite material that's strong, lightweight, and durable, with many applications in transportation, civil engineering, and energy**. CFRP is made up of carbon fibers for strength and stiffness, and a polymer matrix that holds the fibers together and provides toughness.

Here are some properties of CFRP:

- **Strength**: CFRP has a high strength-to-weight ratio and extremely high tensile



Design of auto body

J.R. Fekete, J.N. Hall, in Automotive Steels, 2017

1.5.3 Carbon fiber reinforced polymers

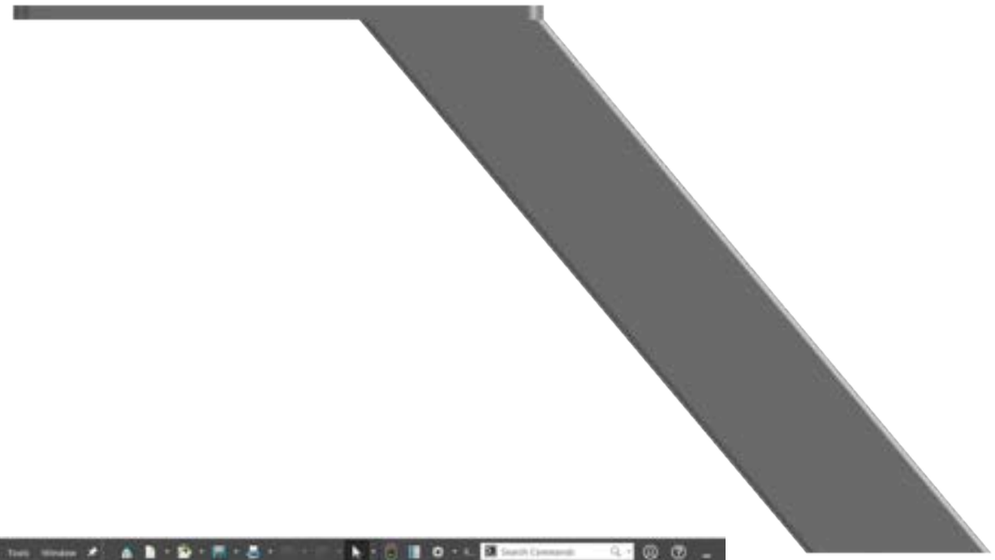
Carbon fiber reinforced polymers are composite materials which rely on the carbon fiber to provide the strength and stiffness while the polymer provides a cohesive matrix to protect and hold the fibers together and provides some toughness. Carbon fibers provide highly directional properties much different than the metals most commonly used for these automotive applications. They can be engineered to achieve mass reductions not achievable by the metals. Since these are artificially composited materials their properties and performance can be tailored to the application through varying strength, length, directionality and amount of the reinforcing fibers and in the selection of the polymer matrix. The largest drawbacks are the high cost in producing the fibers and the low throughput rates at which components can be manufactured. The cumulative time to place the fibers in a mold, inject the polymer and allow the part to set is in the order of a few minutes.

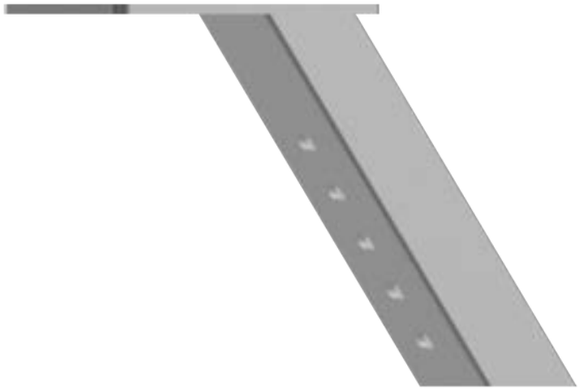
Carbon fiber reinforced polymers are gaining popularity in the luxury, sport segment for mass reduction. These materials, which may also be reinforced with glass or other fibers, have high-price tags and are more suited for lower volume manufacturing as a result of molding cycle times. New technology in reducing fiber cost and panel processing has been in the news in the past few years and the increased implementation is a good indicator progress is being made. More announcements of improvements and applications over the next several years are expected. However, application to higher volume, lower-cost vehicle segments is not expected any time soon.

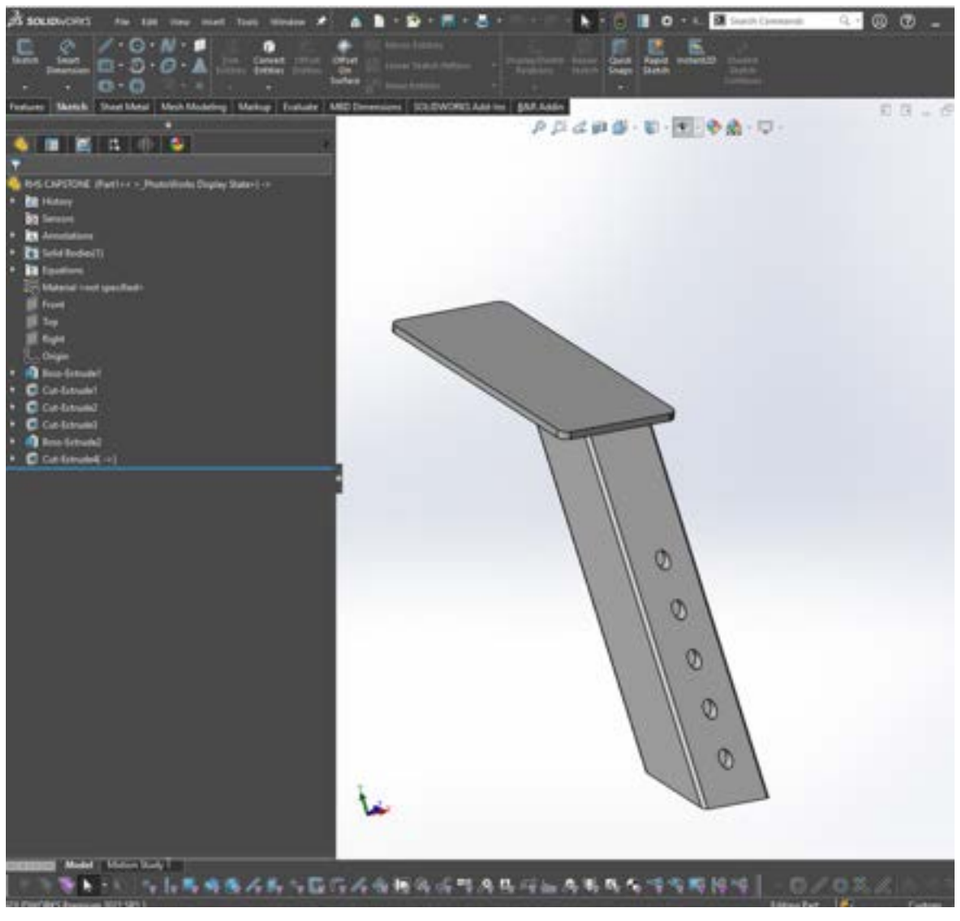
https://www.m-chemical.co.jp/carbon-fiber/en/about/molding/

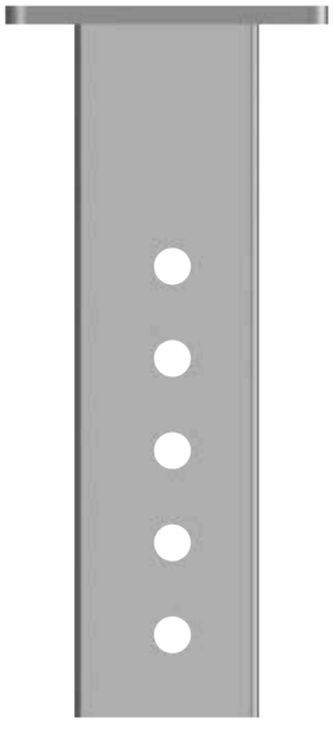
https://www.sciencedirect.com/topics/engineering/carbon-fibre-reinforced-polymer#:~:text=Carbon%20fiber%20reinforced%20polymers%20are,together%20and%20provides%20some%20toughness.

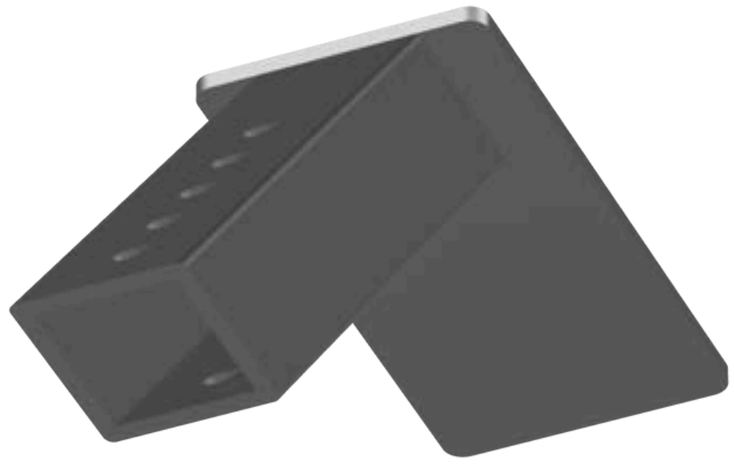
CUSTOM PART DESIGN











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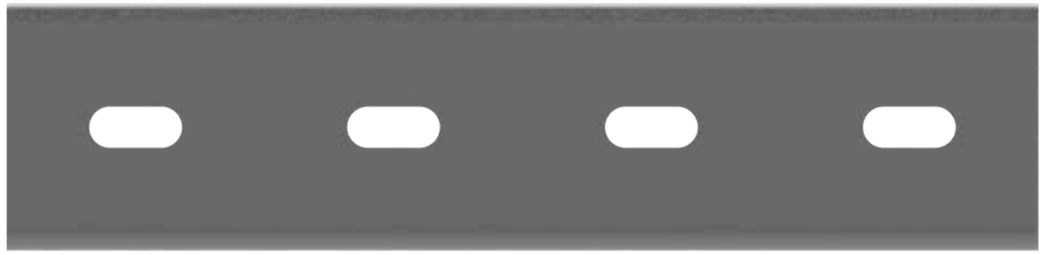

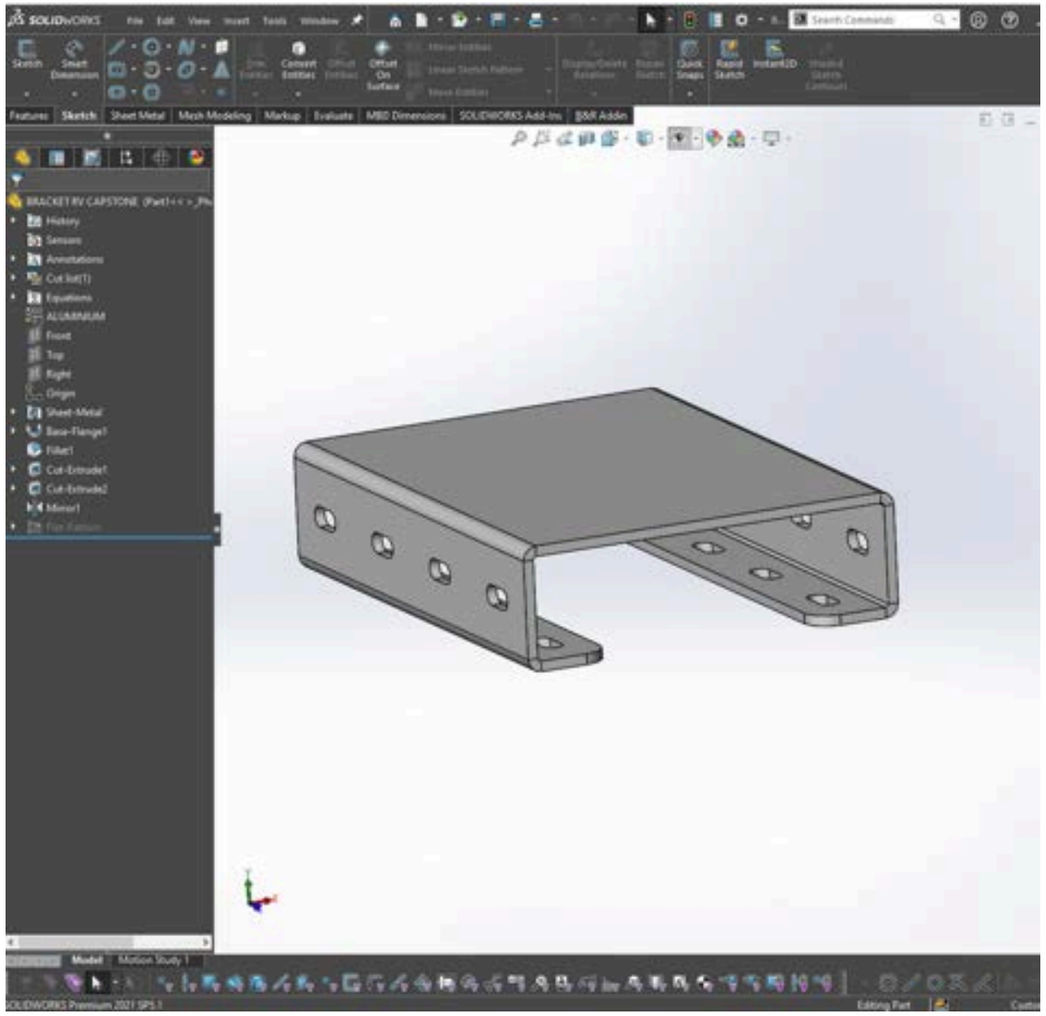

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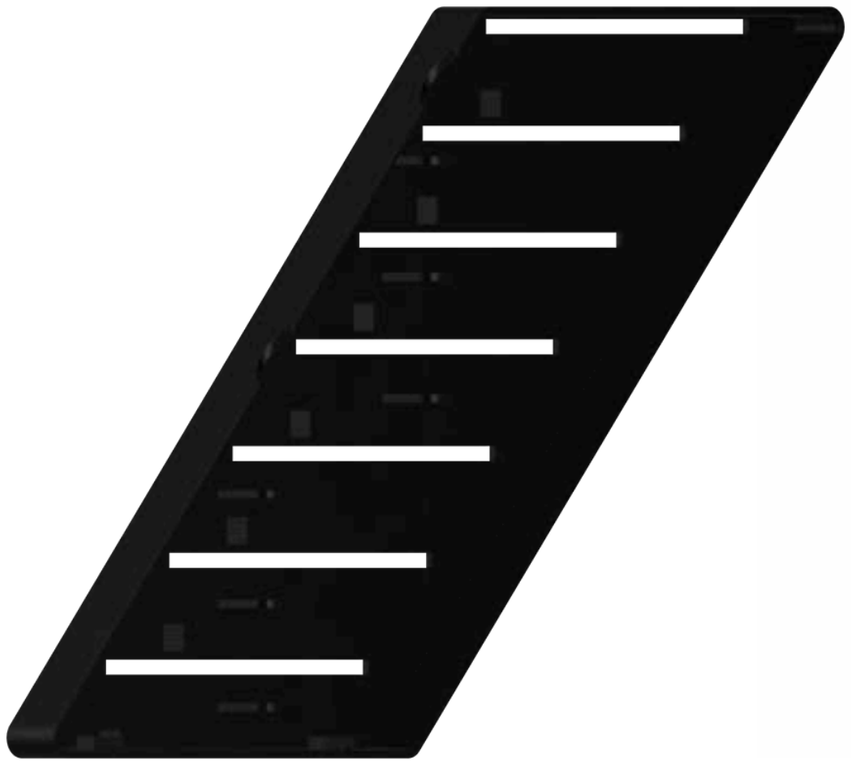

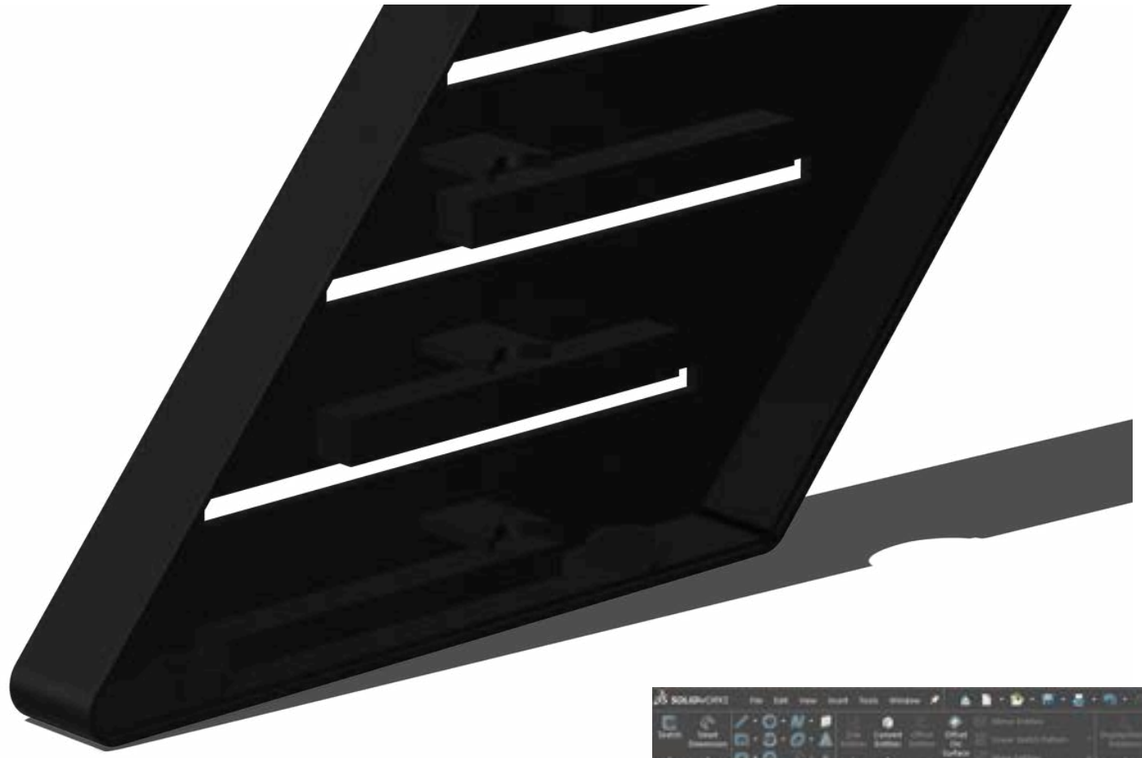

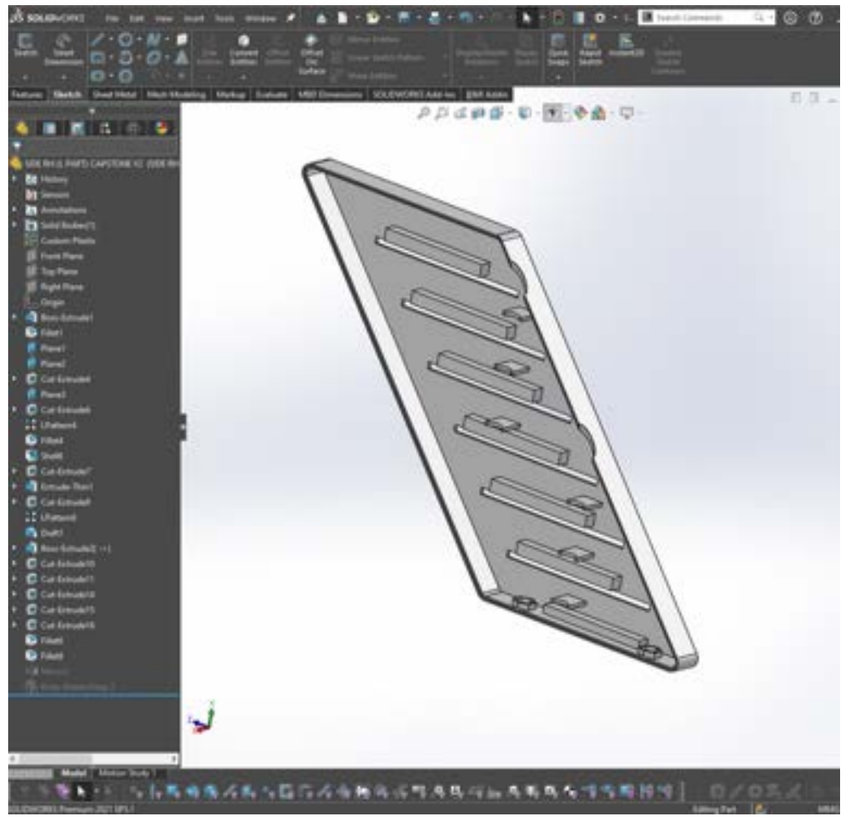

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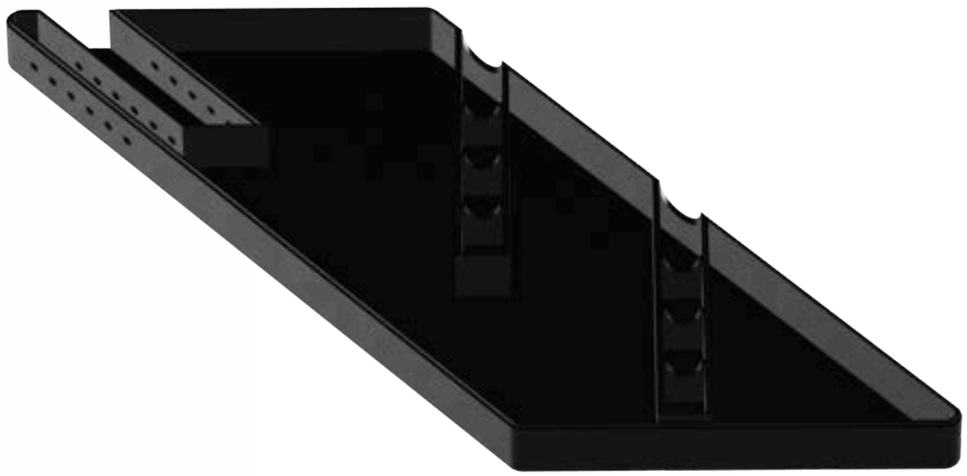

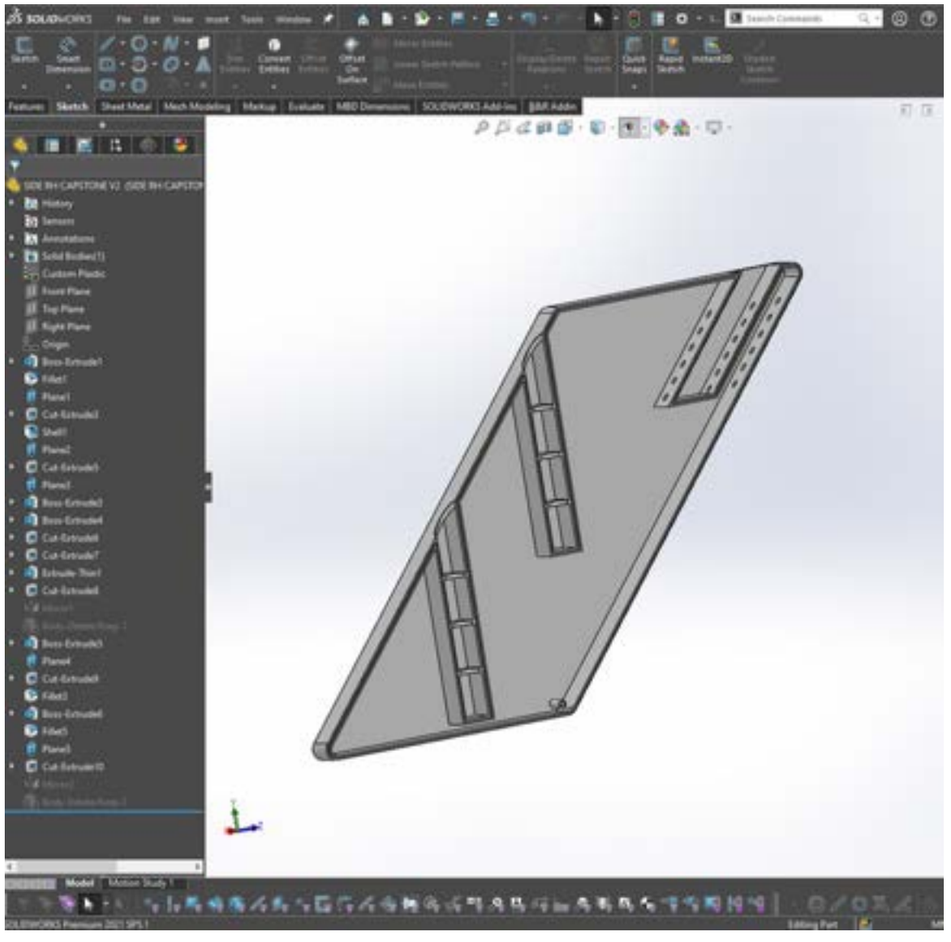

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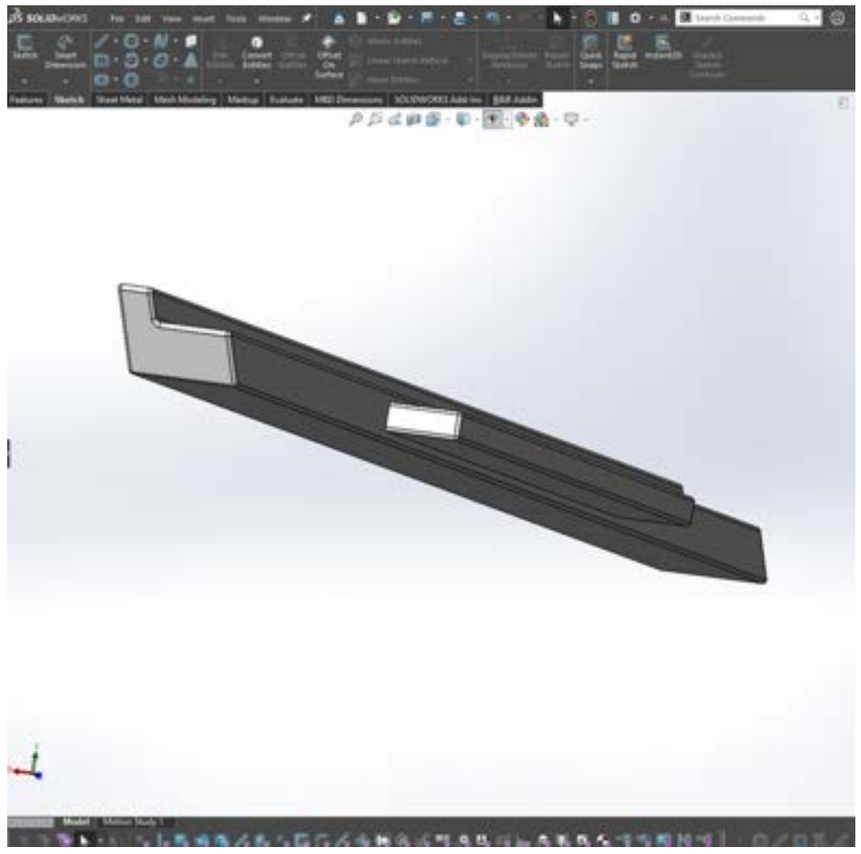

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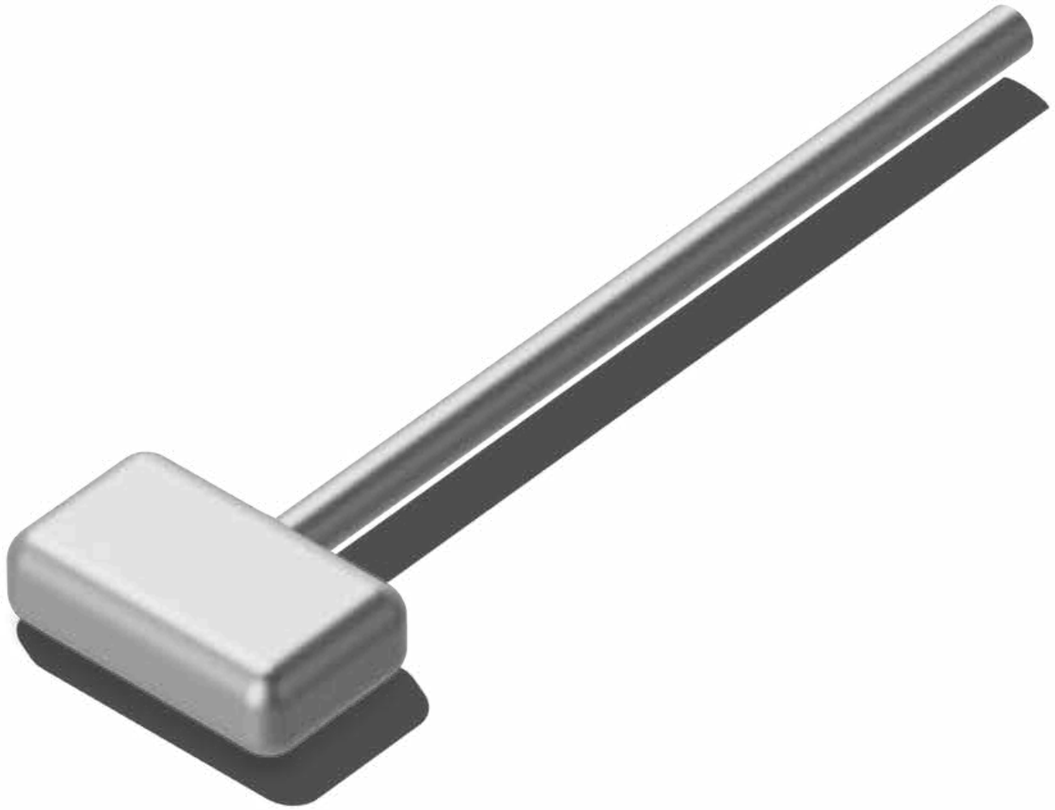

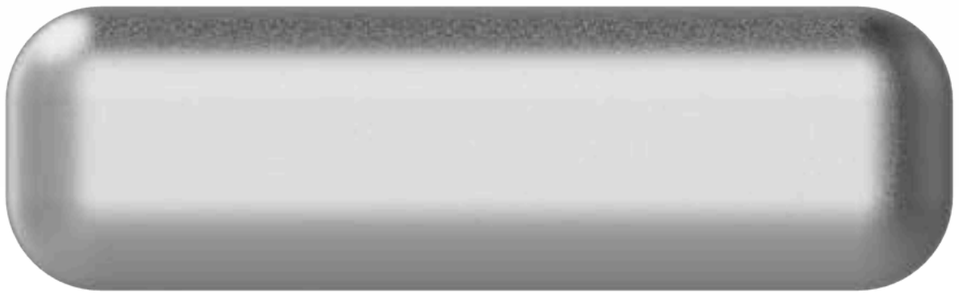

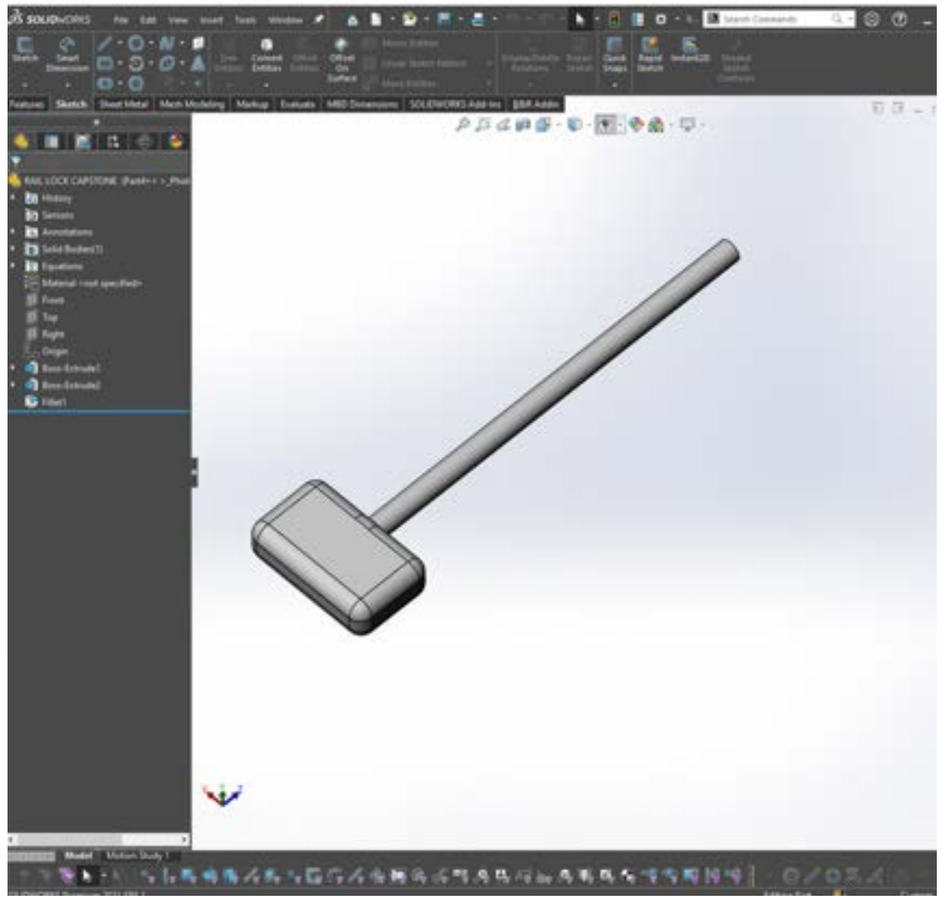

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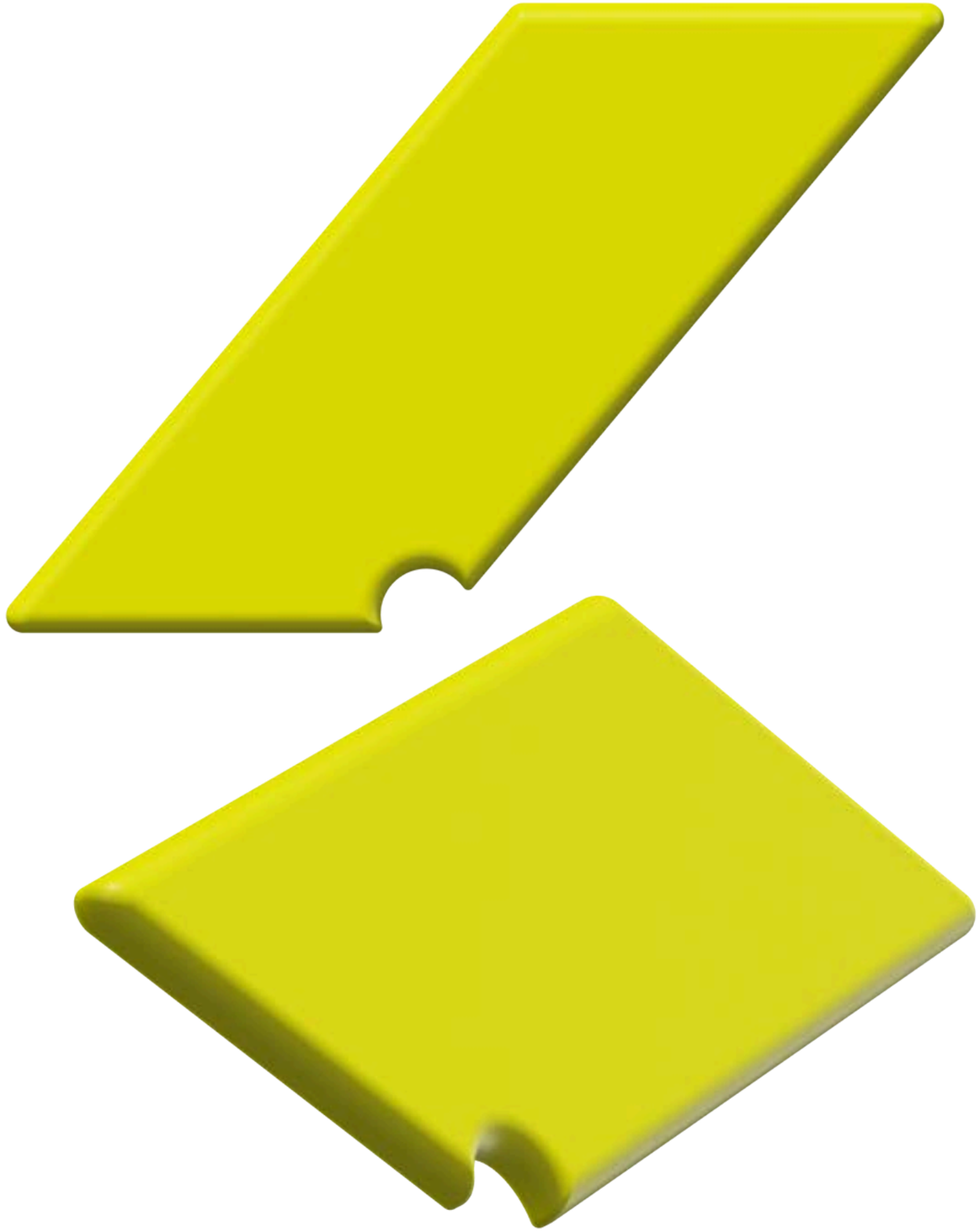
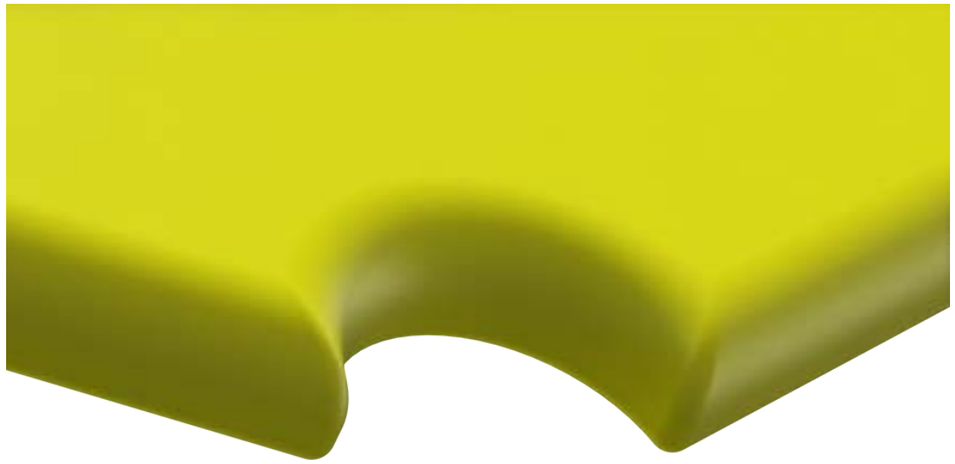
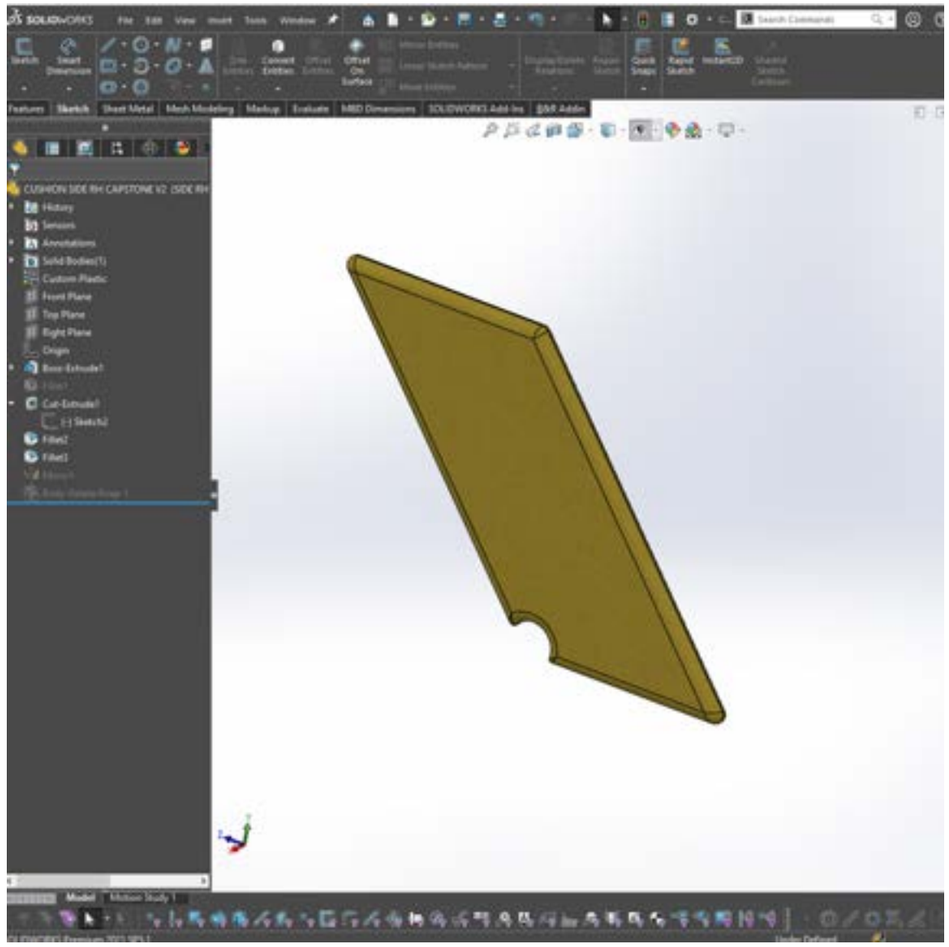


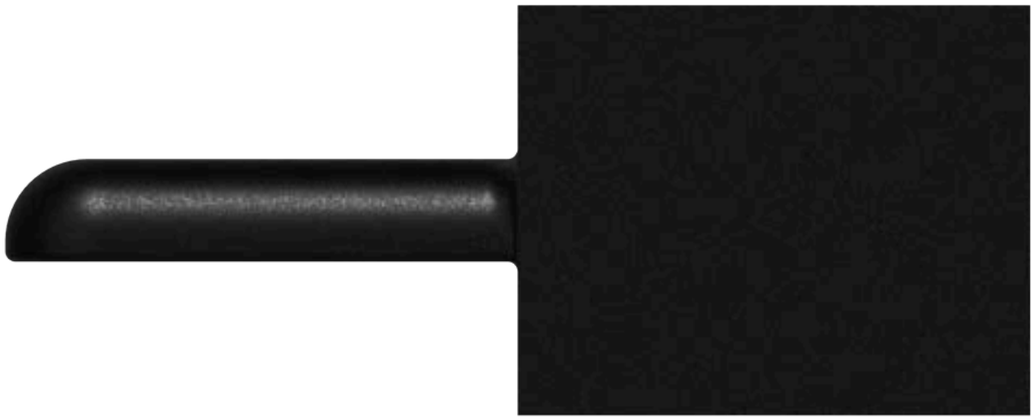


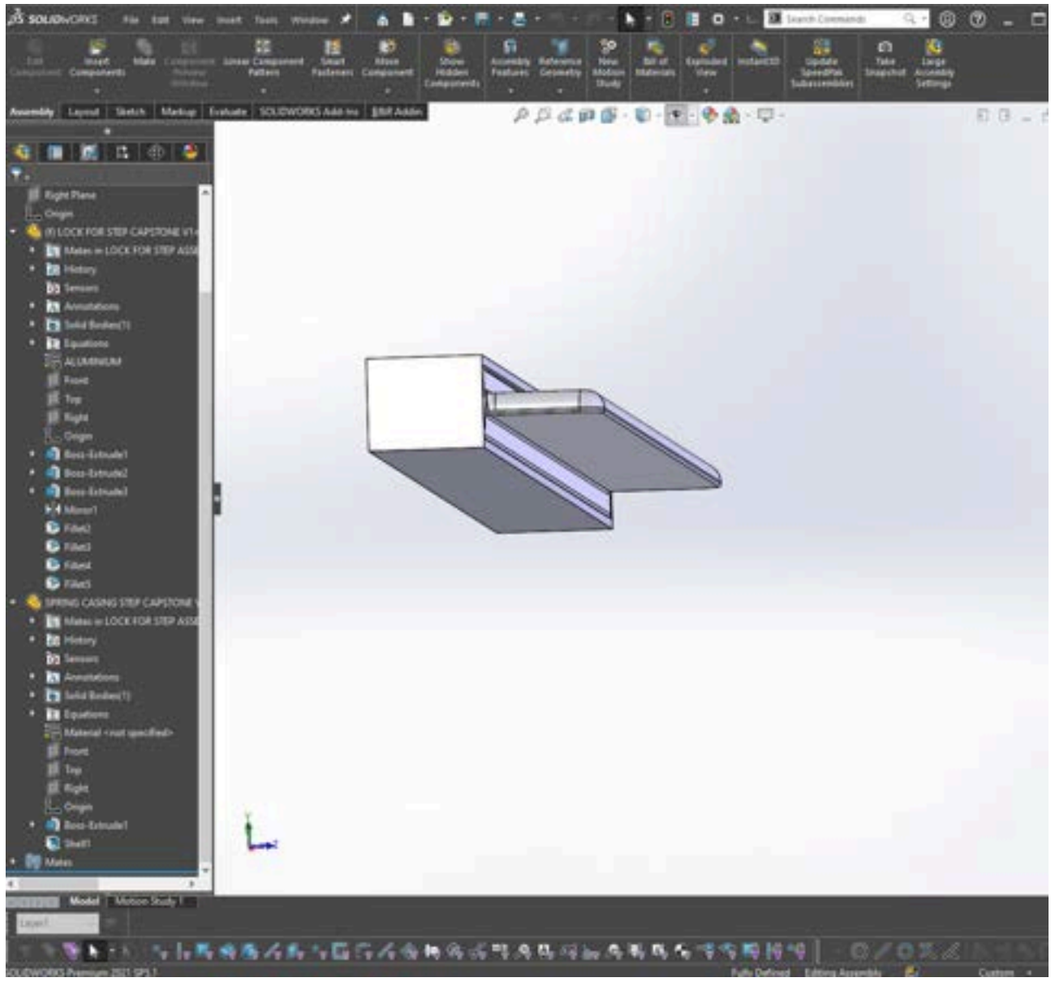


RHYS DUGGIN

10/2024

CUSTOM PART DESIGN





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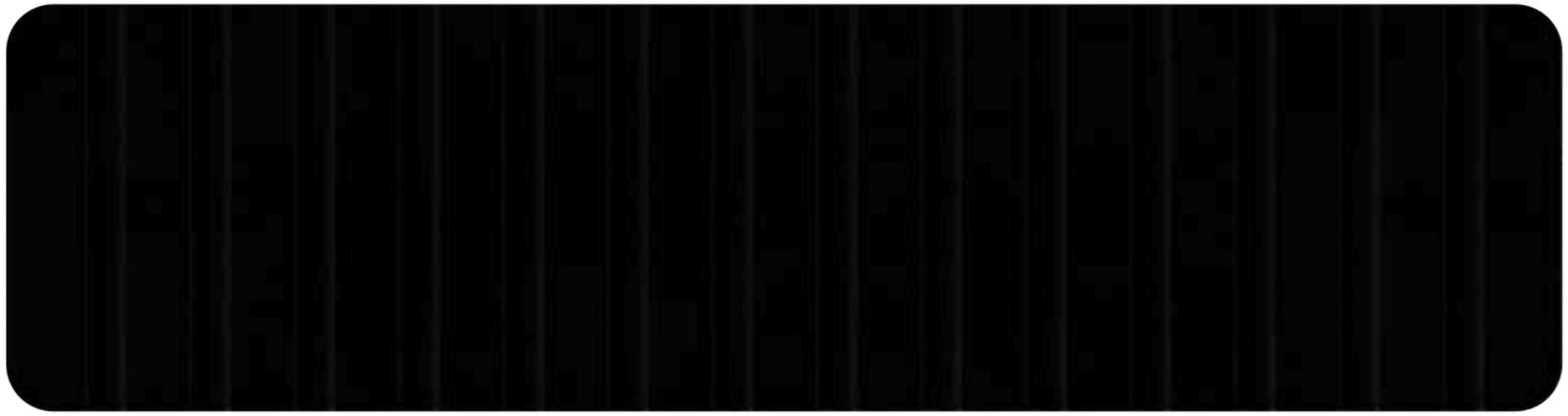

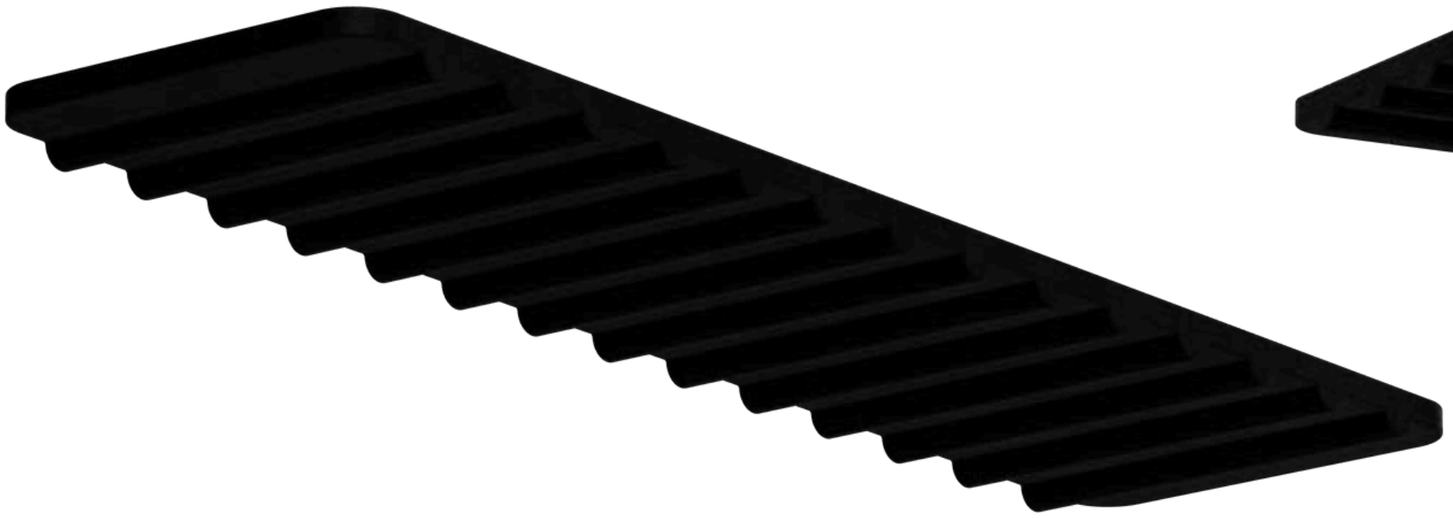

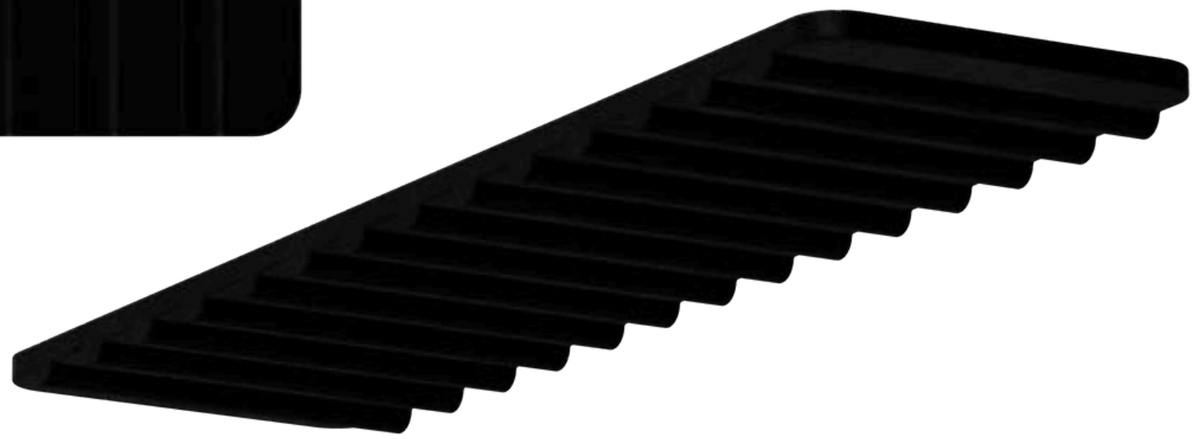

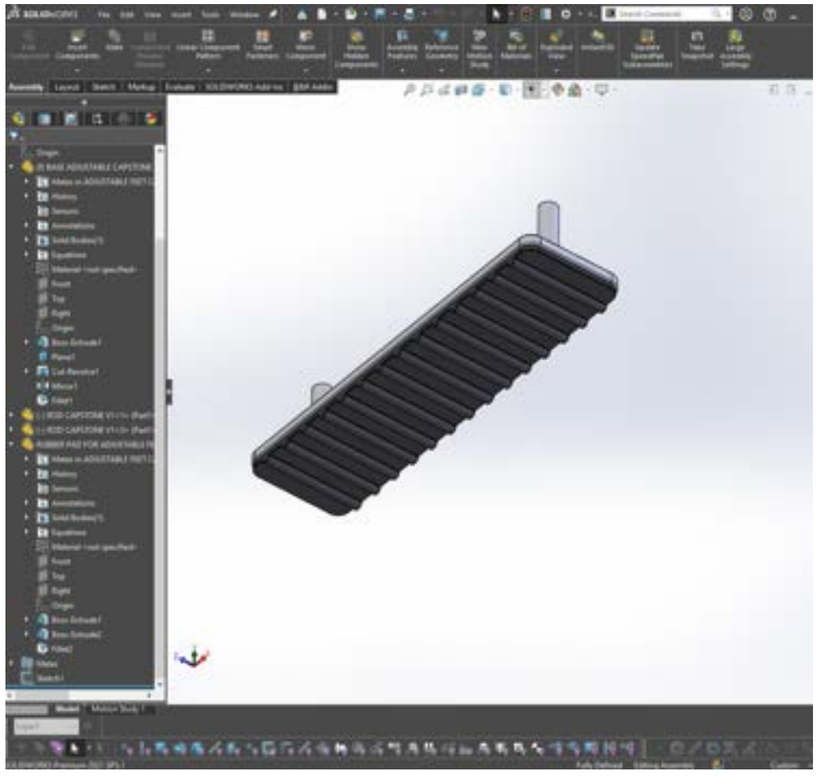

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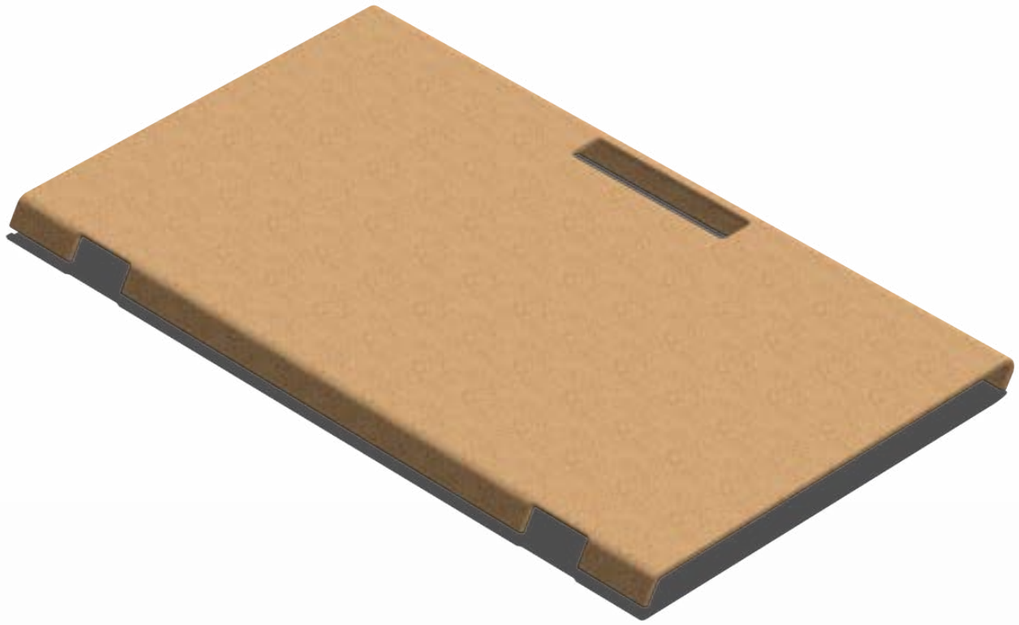

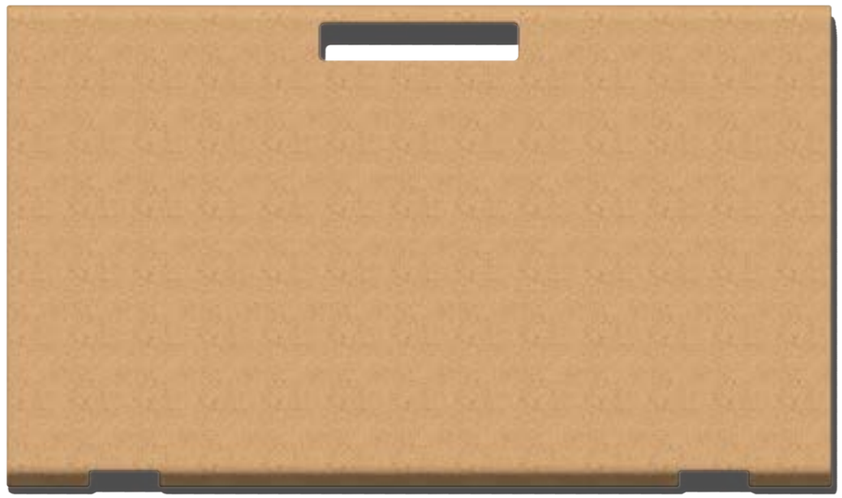

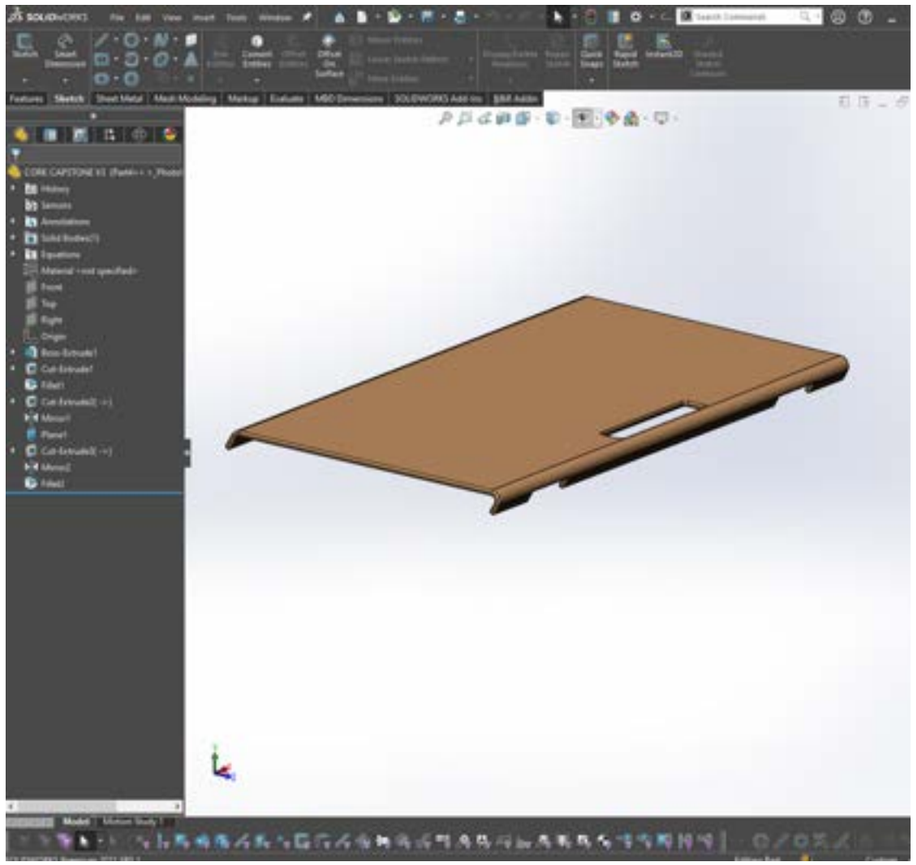

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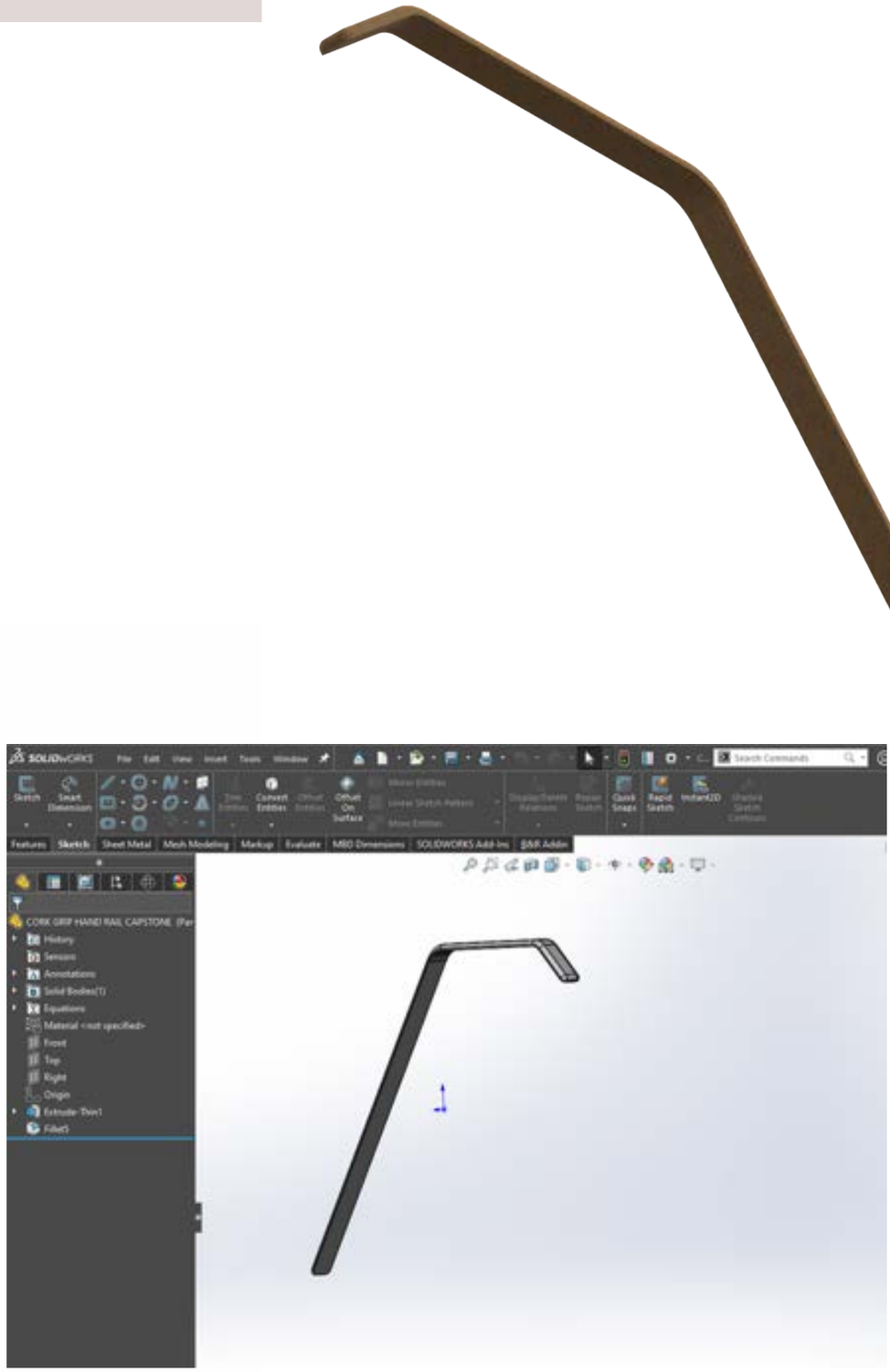

RHYS DUGGIN

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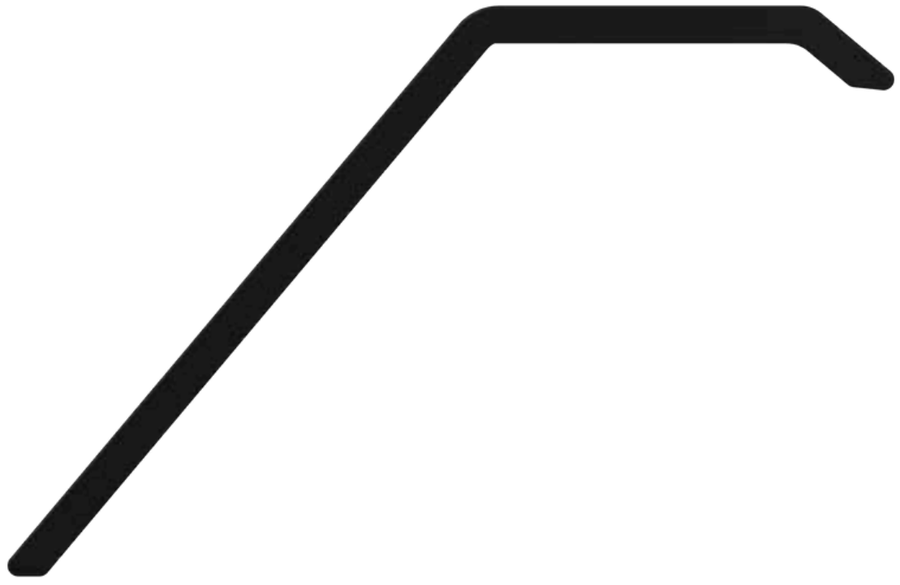

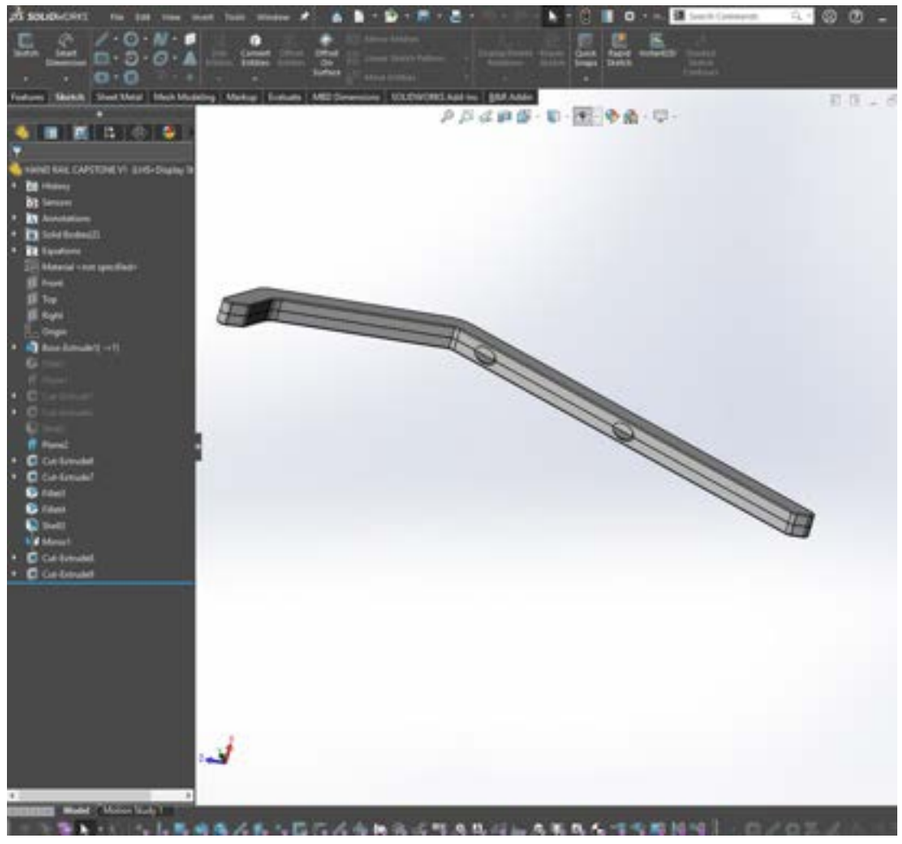

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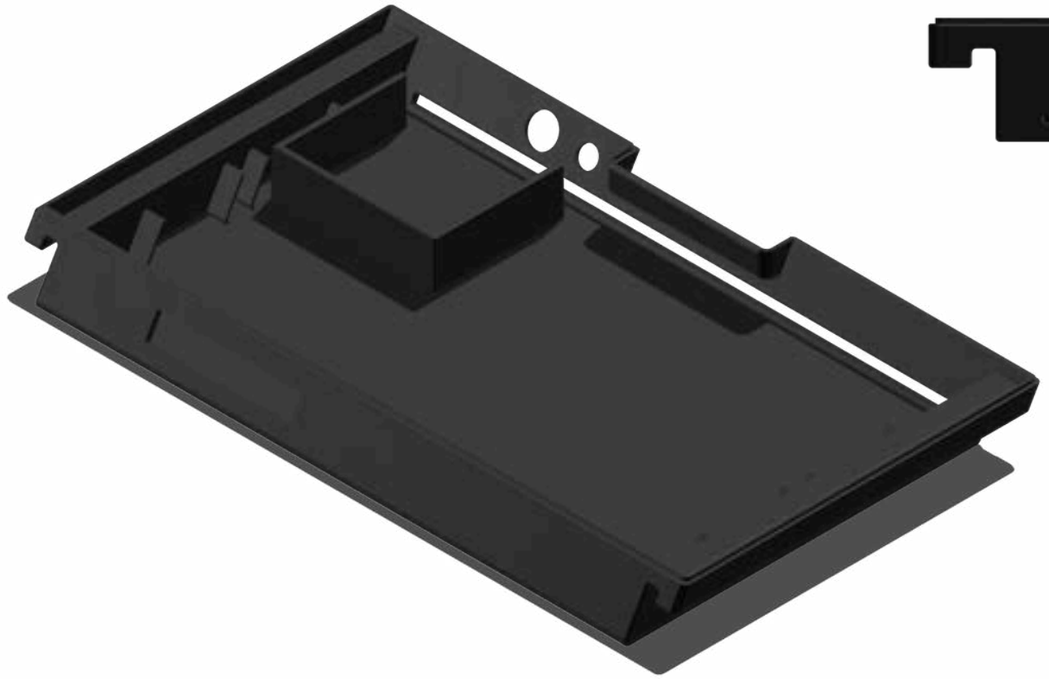

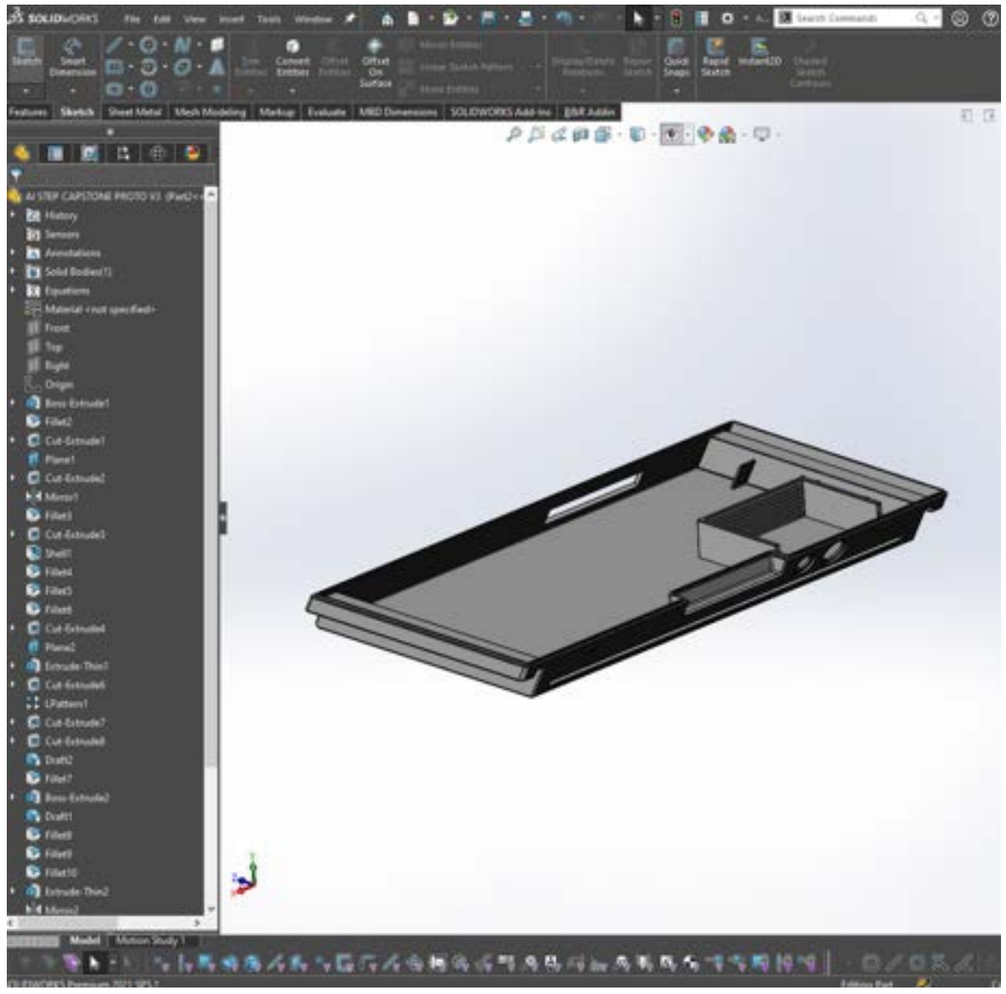

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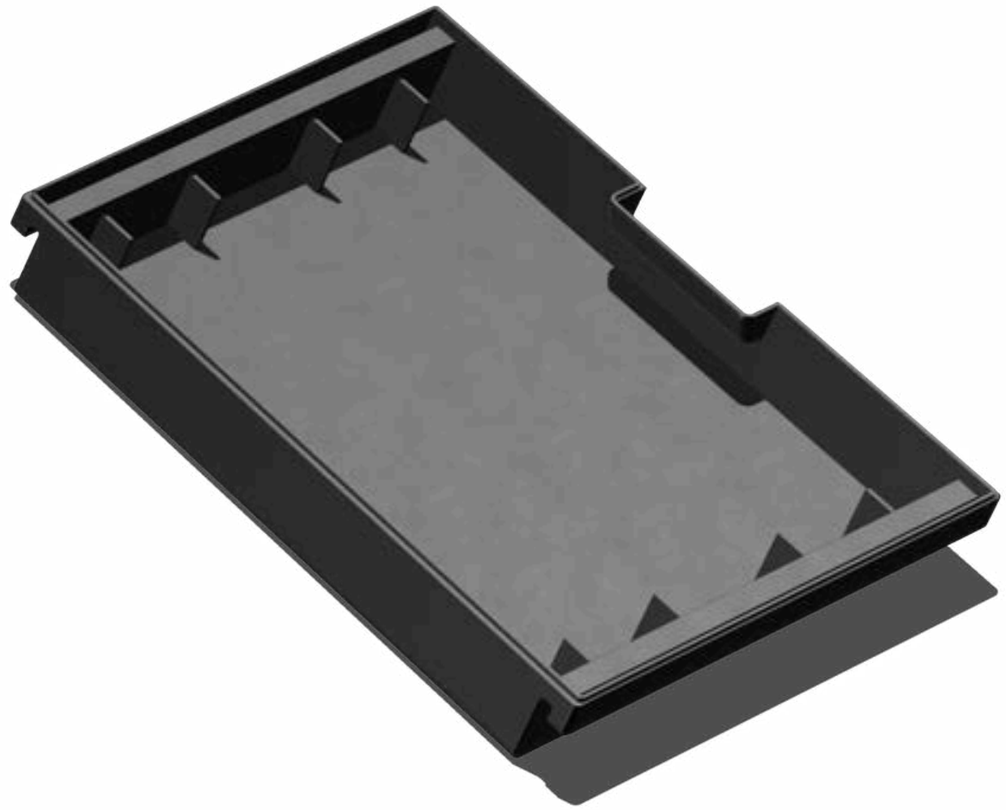

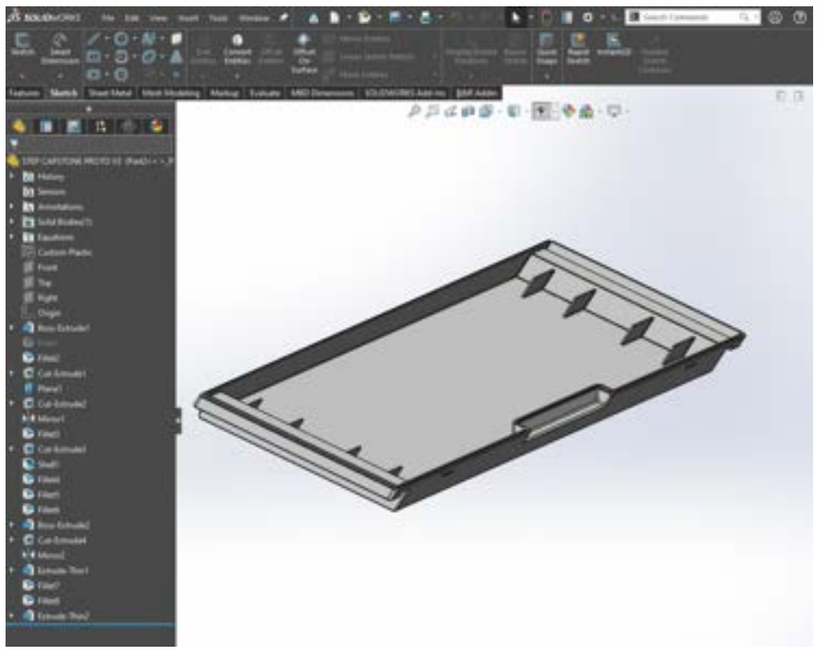

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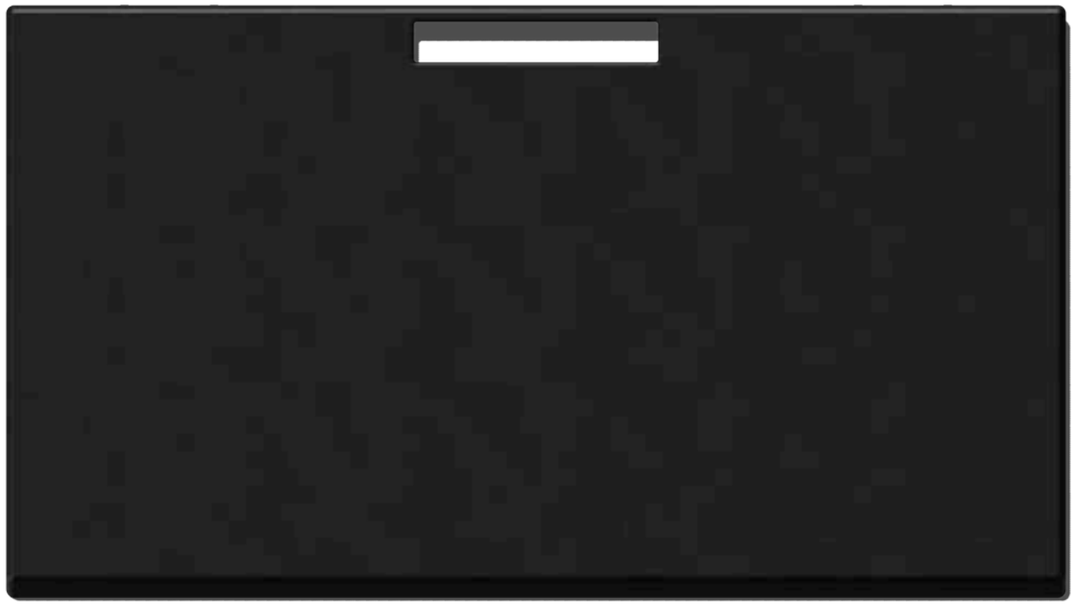
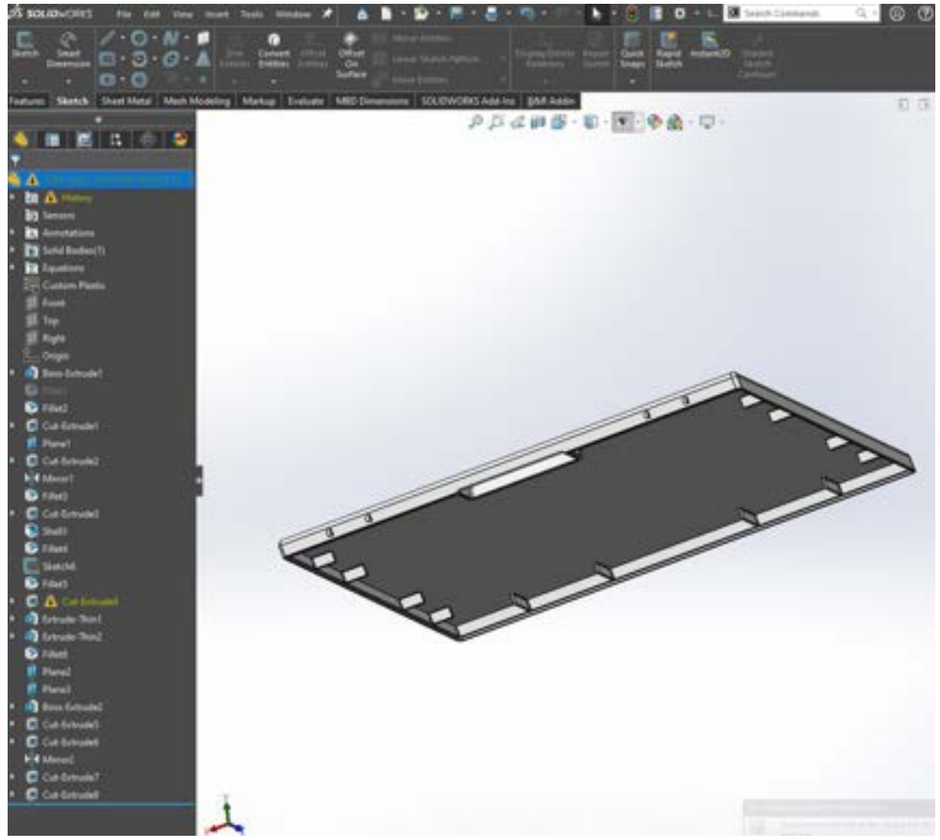
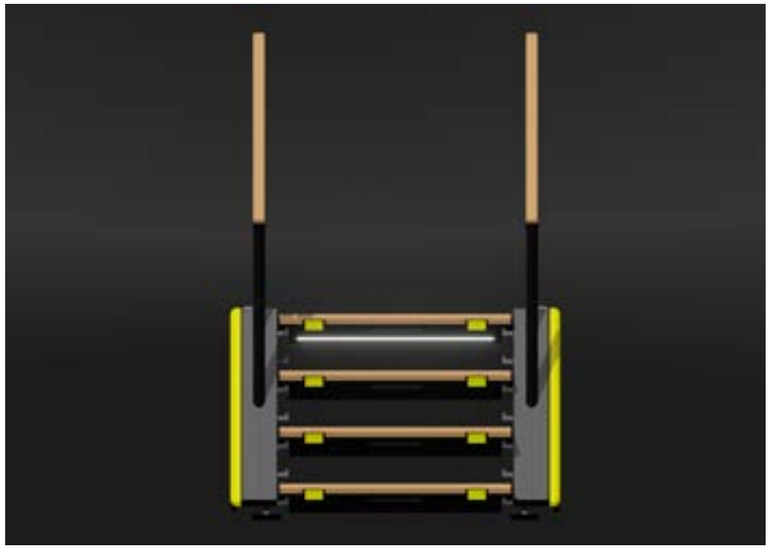
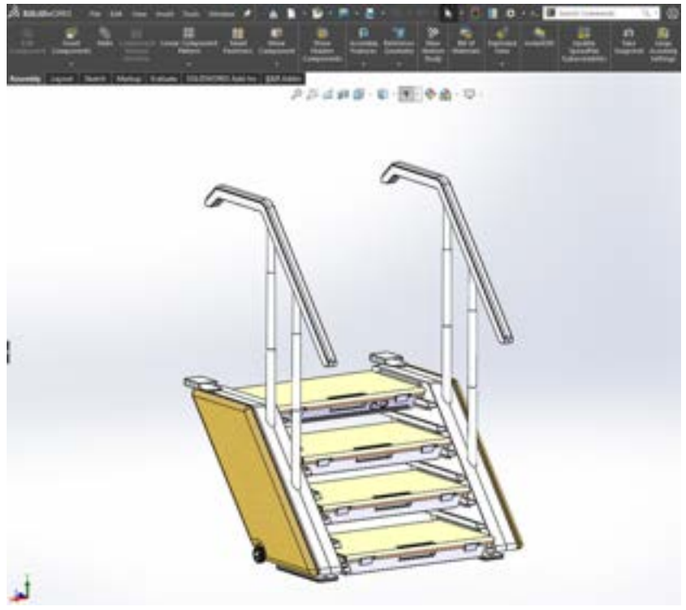
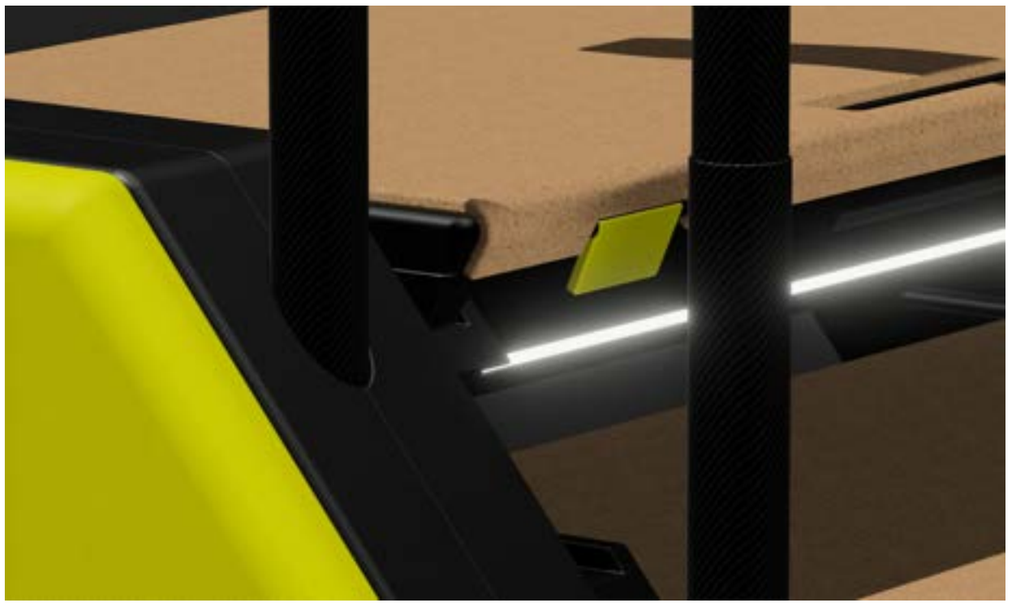


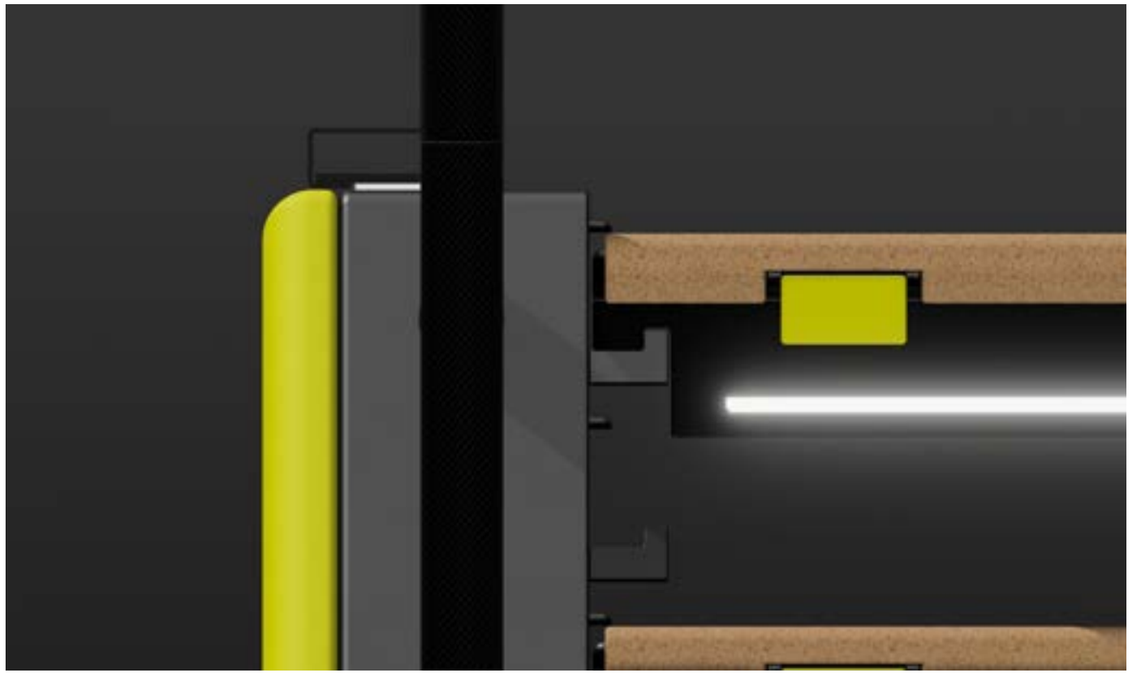


AESTHETIC TESTING









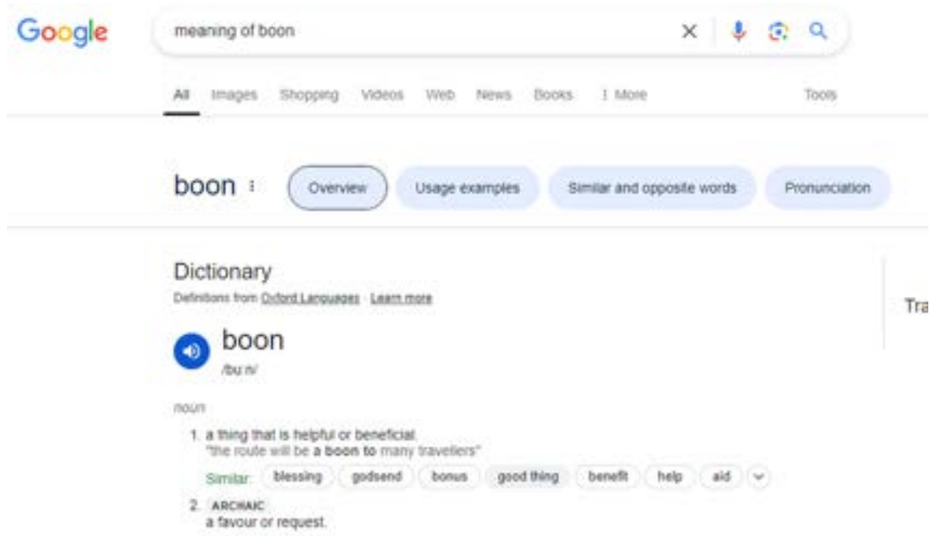
DELIVER PHASE

RHYS DUGGIN

10/2024

BRANDING

Boon Camp Co.
new era of
camping



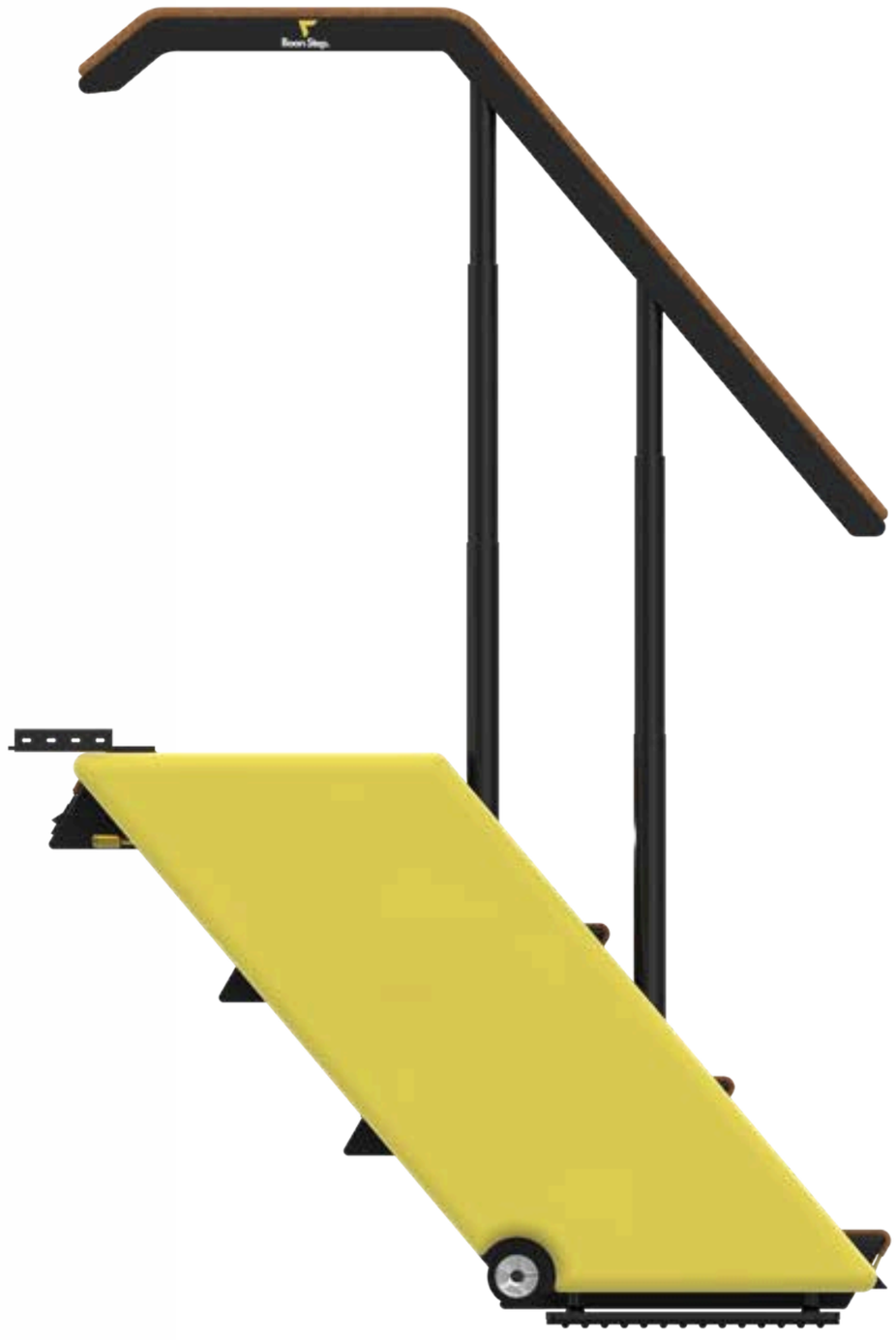
Boon Step.

Boon Step.

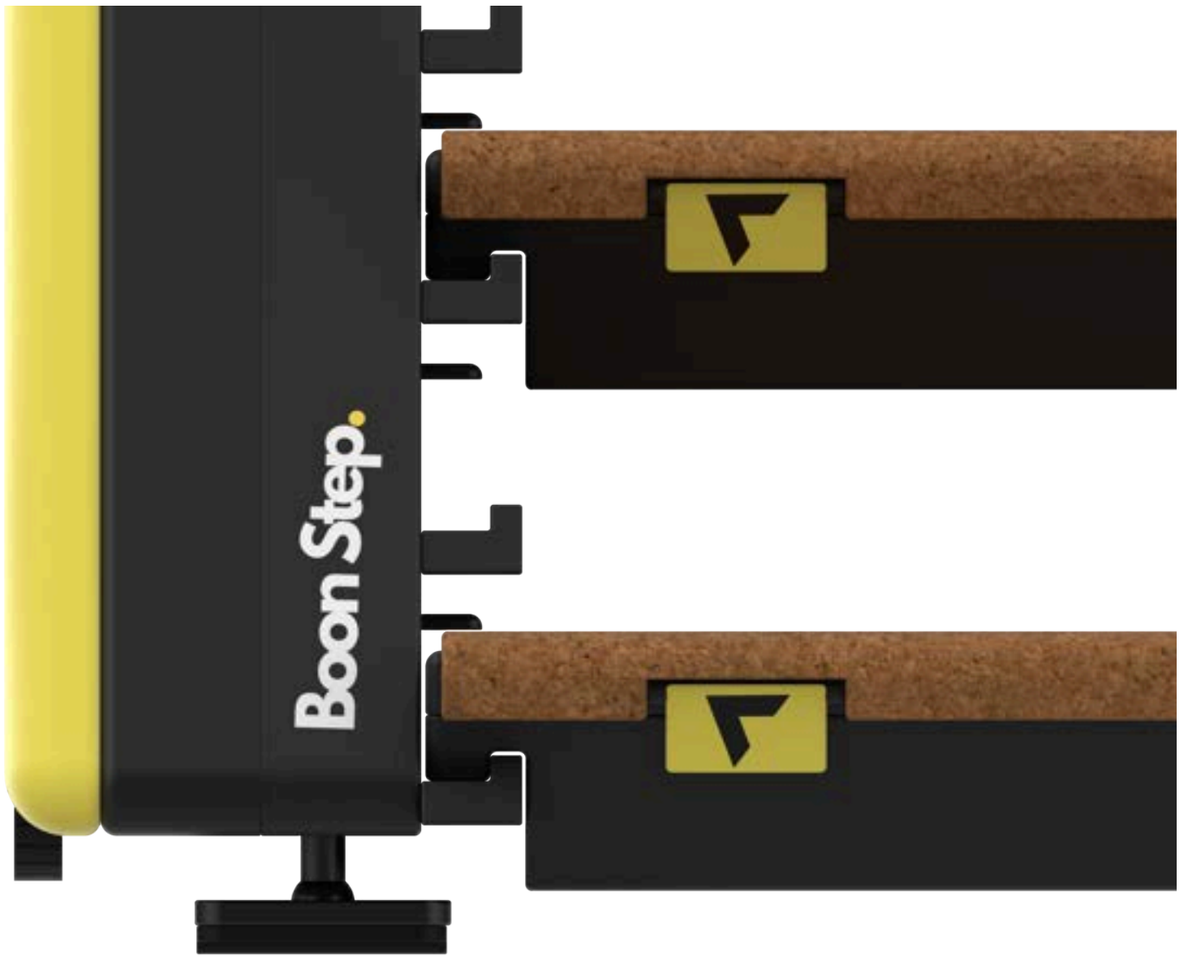
Boon Step.

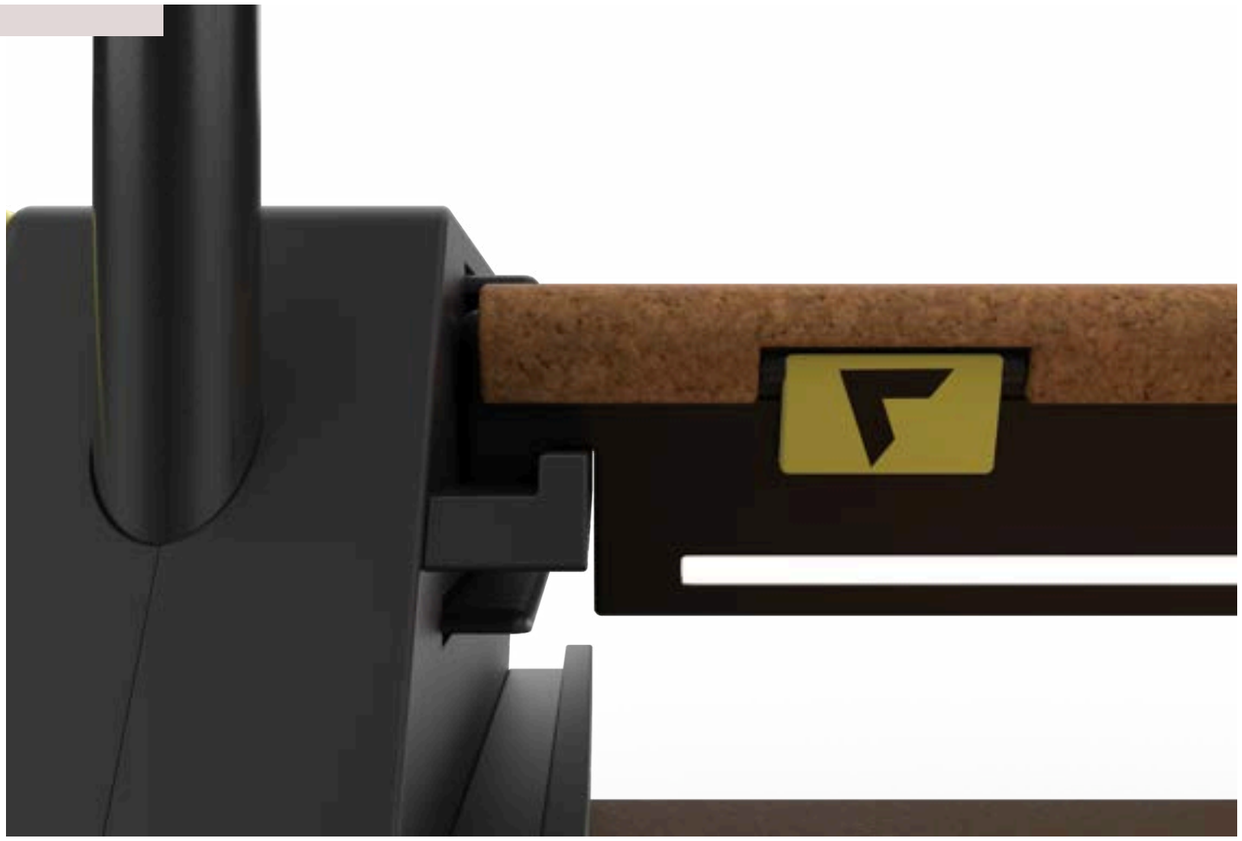
Boon Step.

FINAL RENDERS



FINAL RENDERS

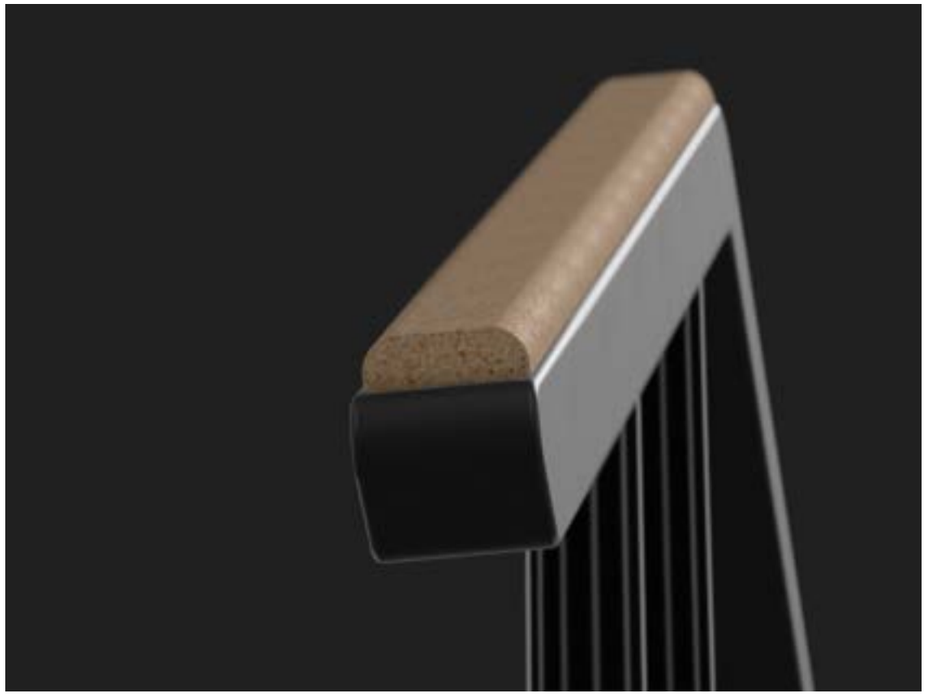


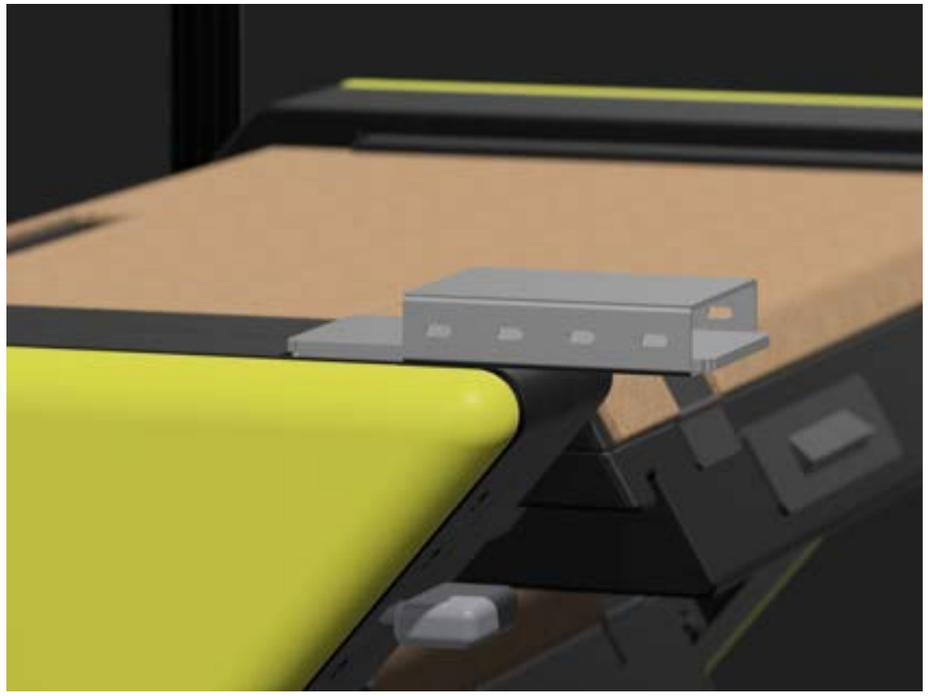


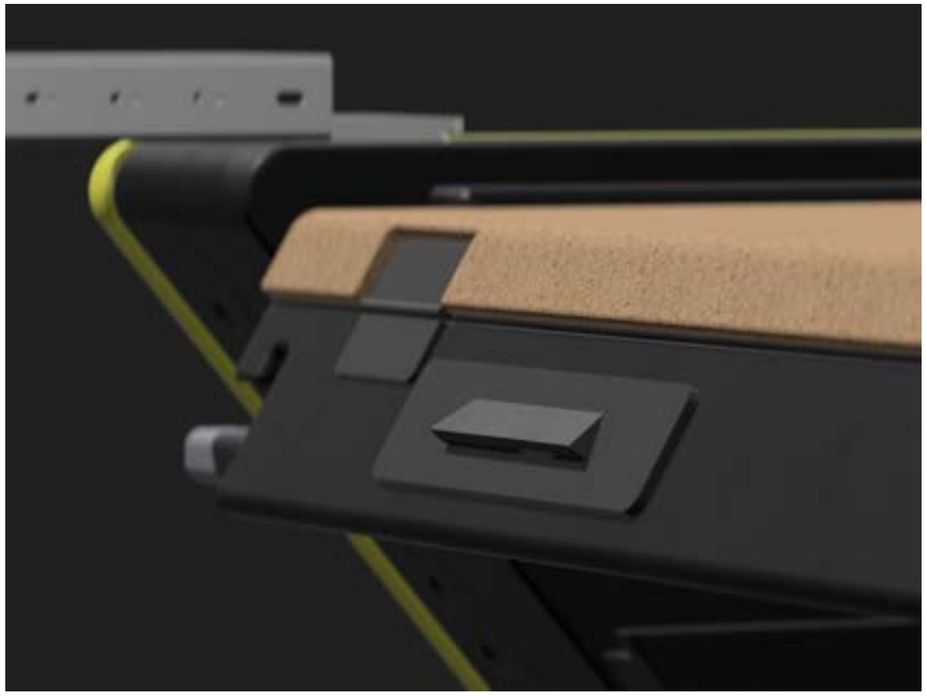
FINAL RENDERS

FINAL RENDERS

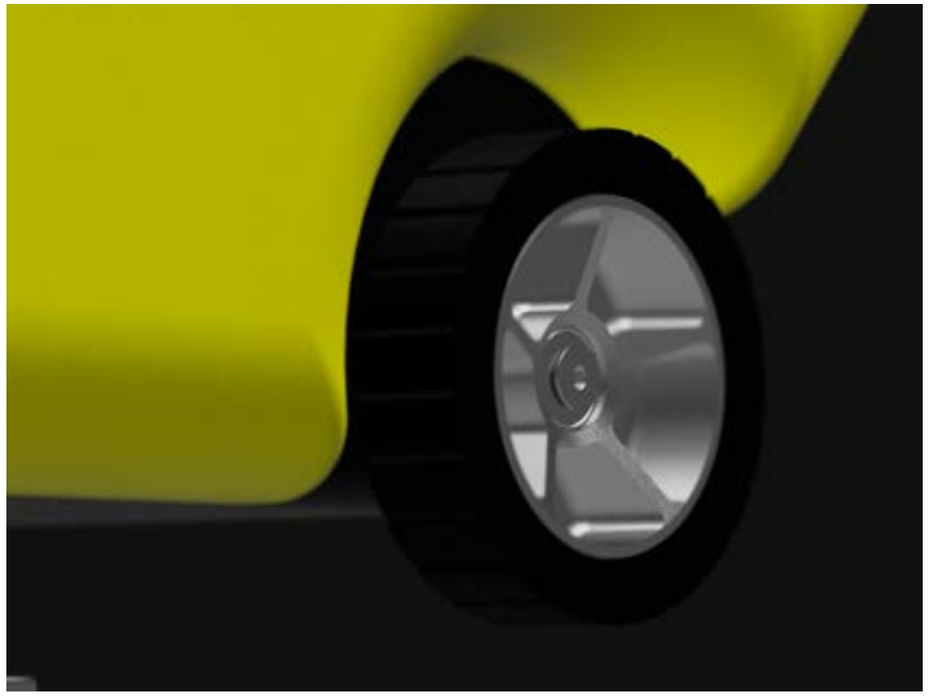
FINAL RENDERS

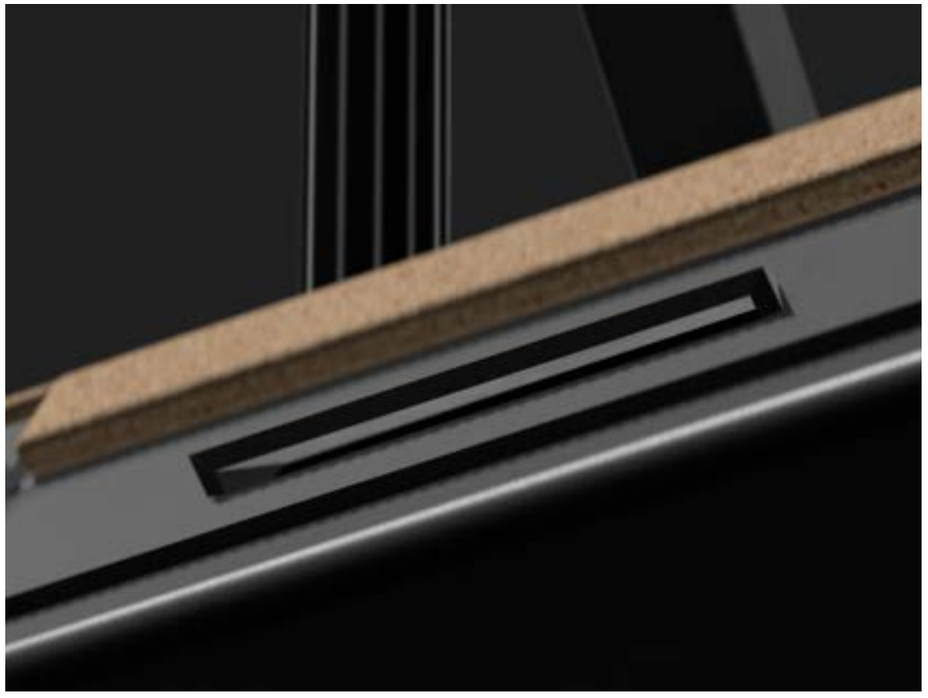


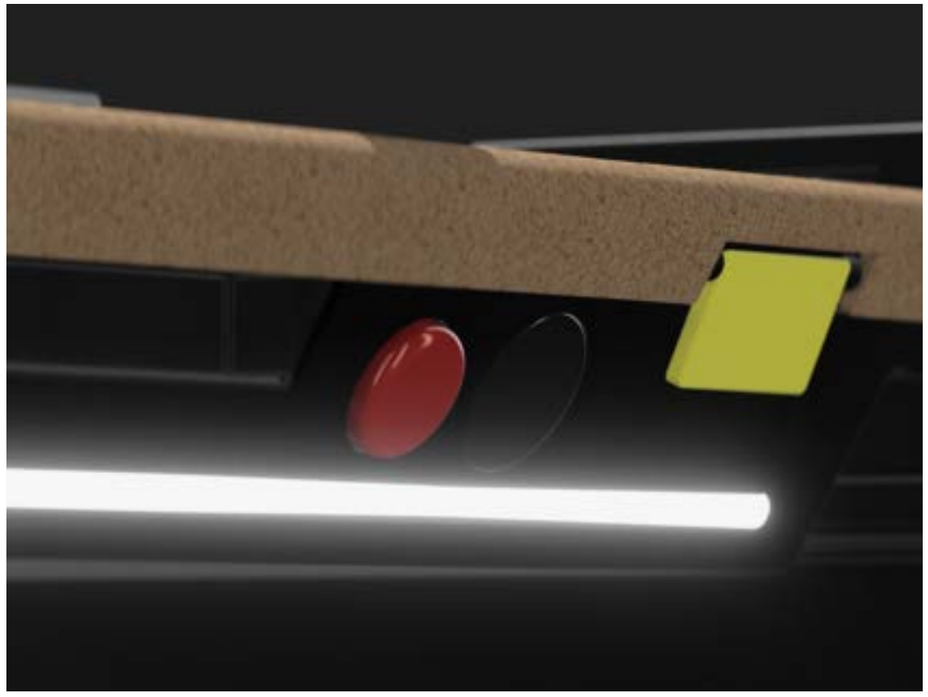




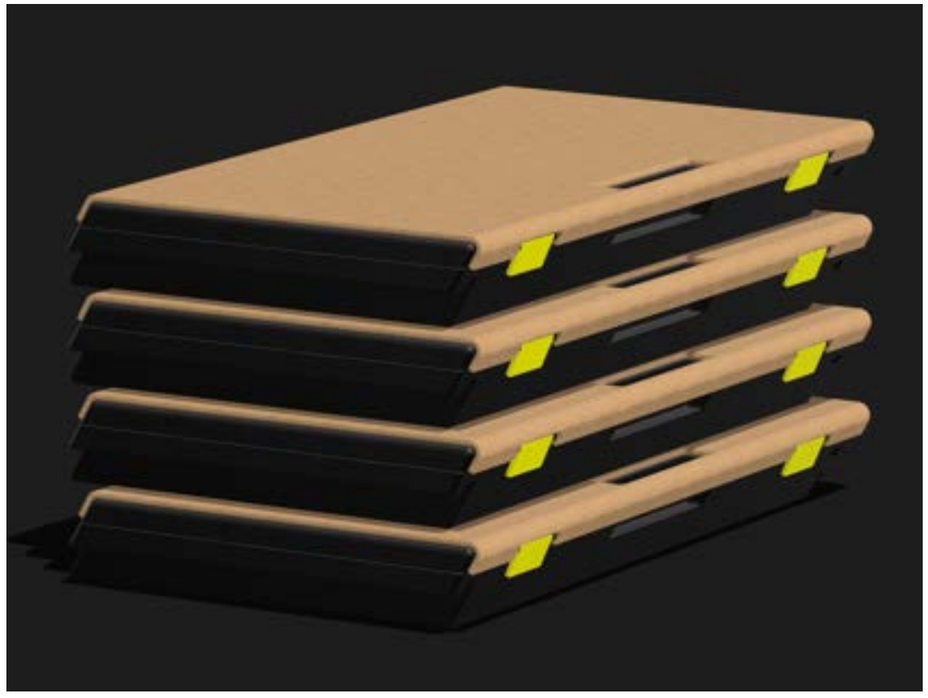
FINAL RENDERS

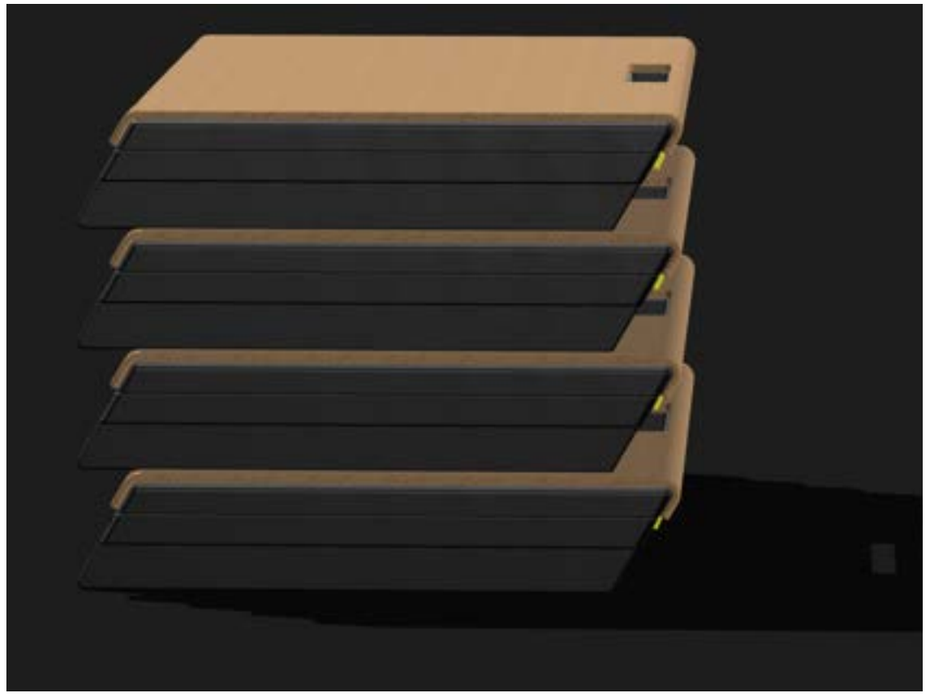


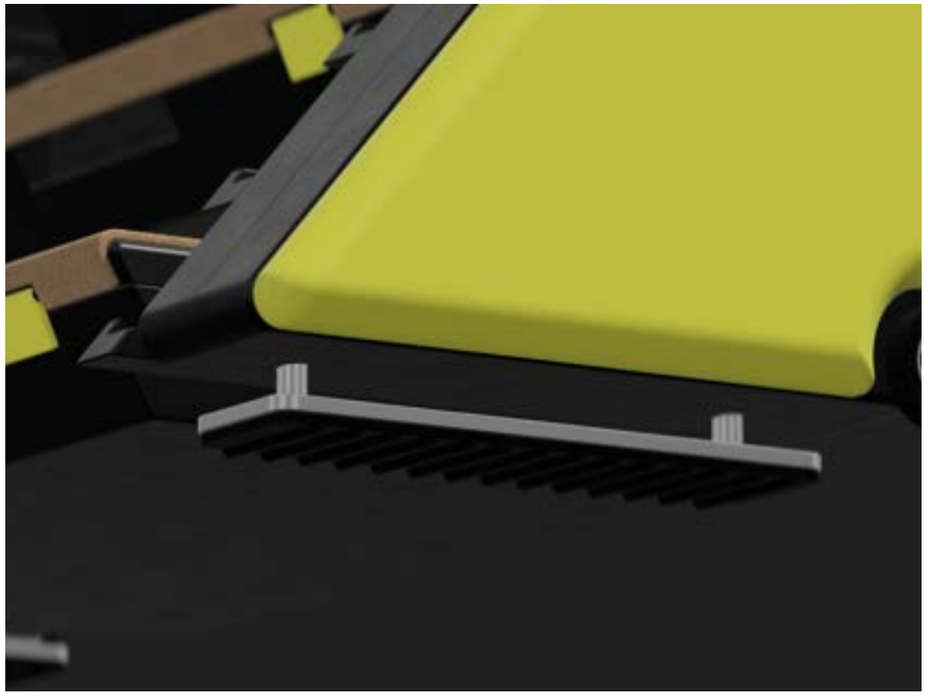




FINAL RENDERS







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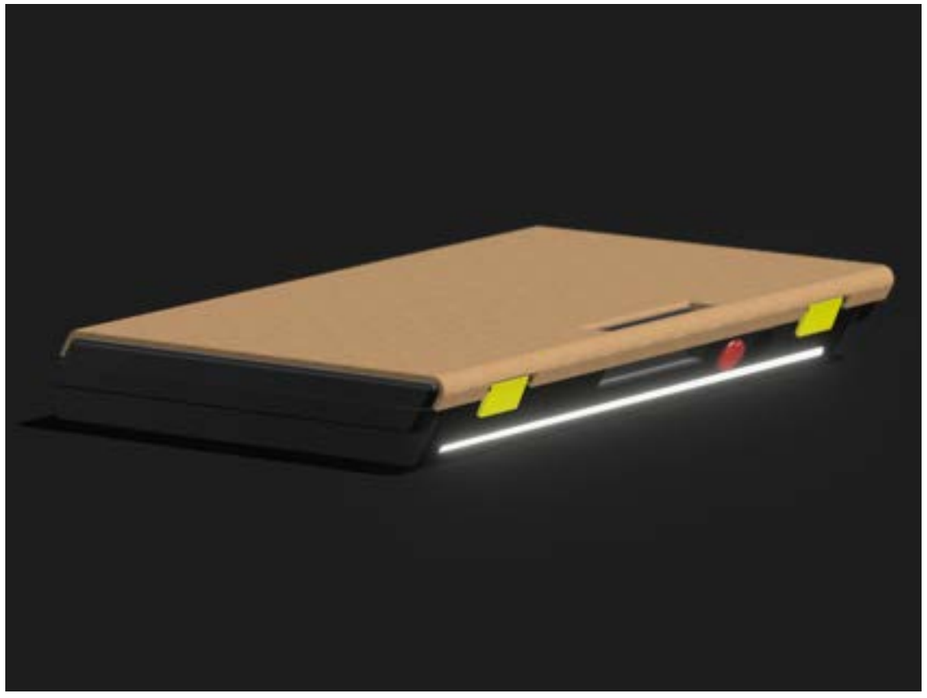

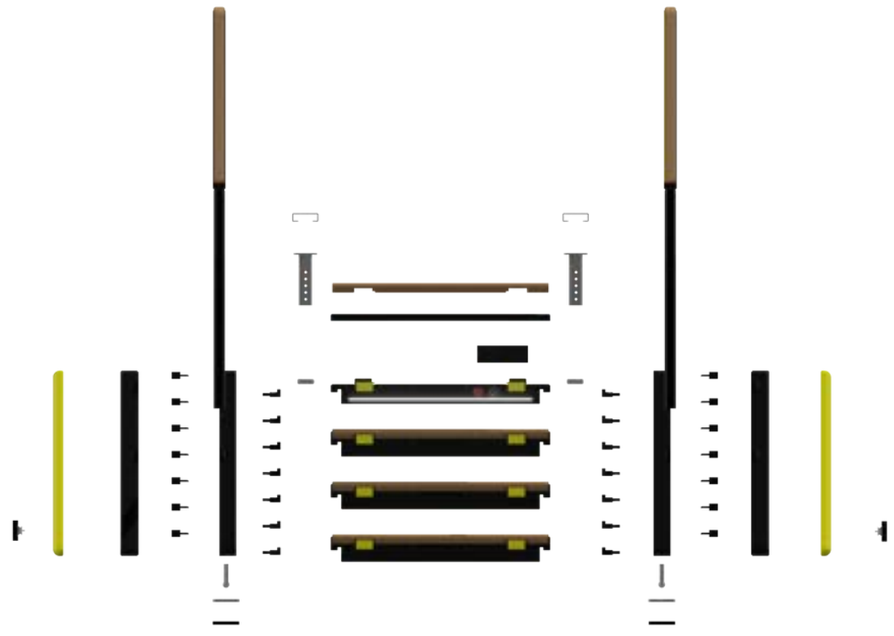

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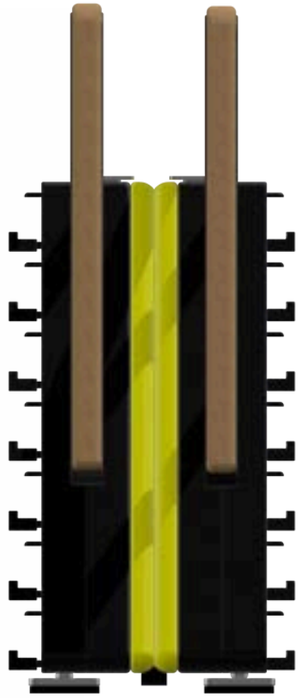
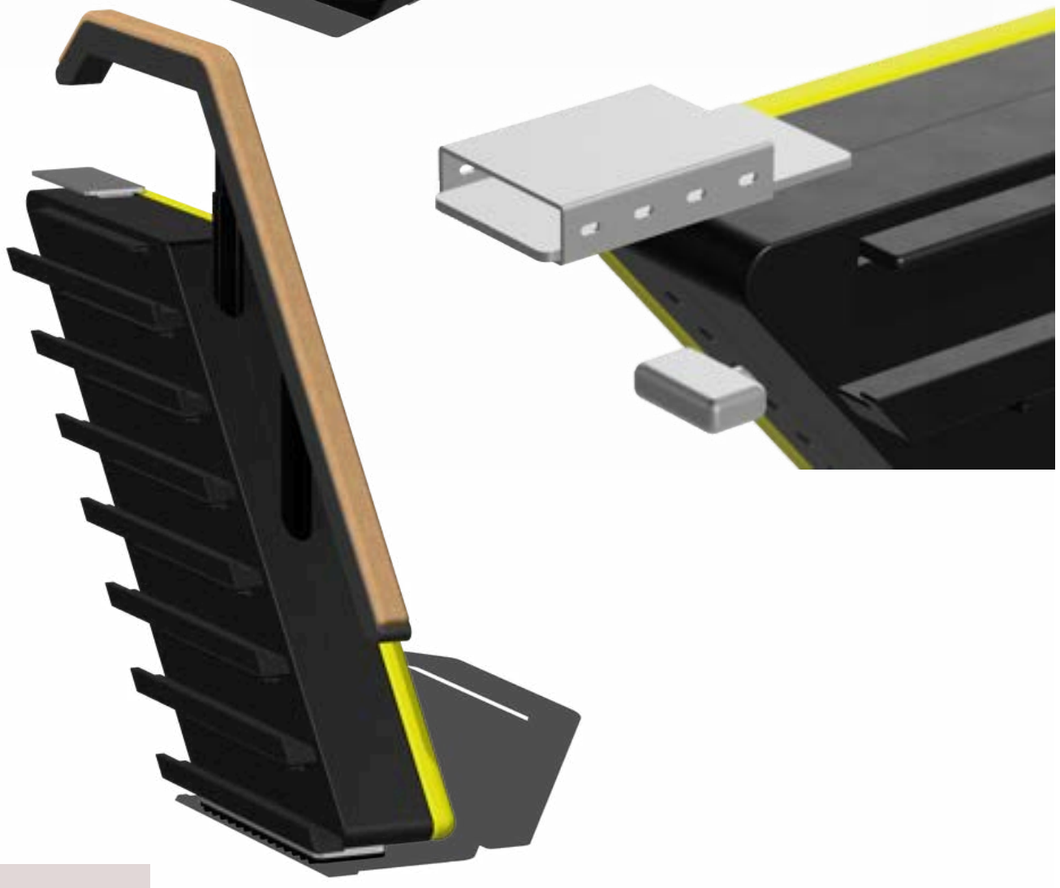




Boon Step.

By Rhys Duggin

Goal.

The goal of this project was to design a product that **enhances** the **safety** and **experience** of elderly RV campers that may suffer from minor mobility impairments.

Project Overview.

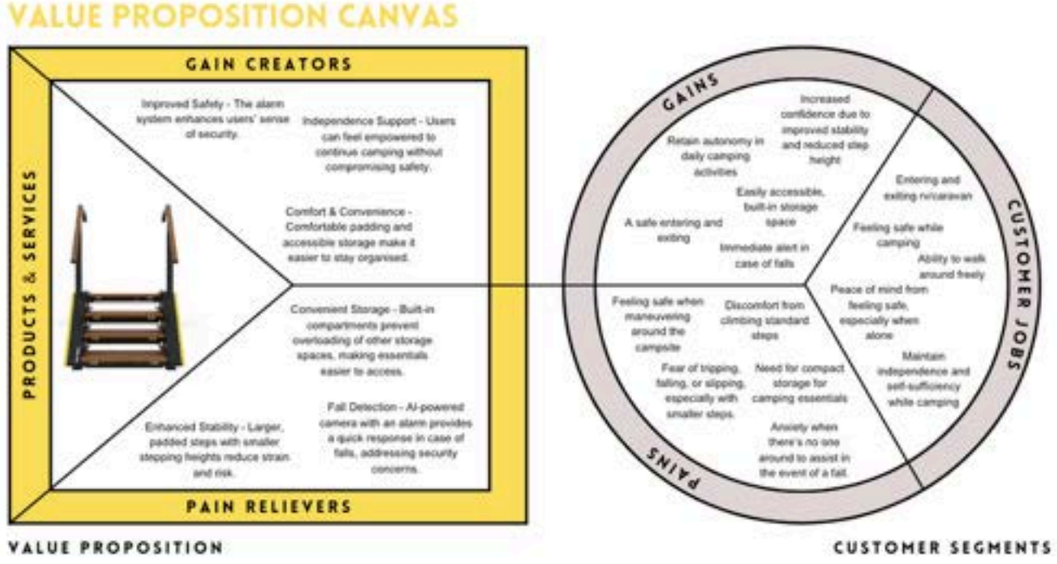
The Research.

The objective of the research was to inform the development of a product that aims to **enhance the safety and experience of elderly RV campers with mobility impairments.**

Problem Identified

Elderly RV campers with mild to moderate mobility impairments face safety and accessibility challenges when entering and exiting RVs. Current market solutions often focus on severe disabilities or none at all, neglecting the needs of this elderly group.

The Value.

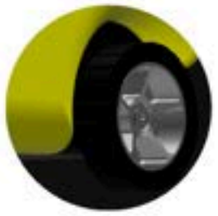


Key Features.

Stackable modular storage steps

Universal RV mounting

Ergonomic soft-touch cork rails that fold up and down to assist the user



Off-road wheels for added maneuverability

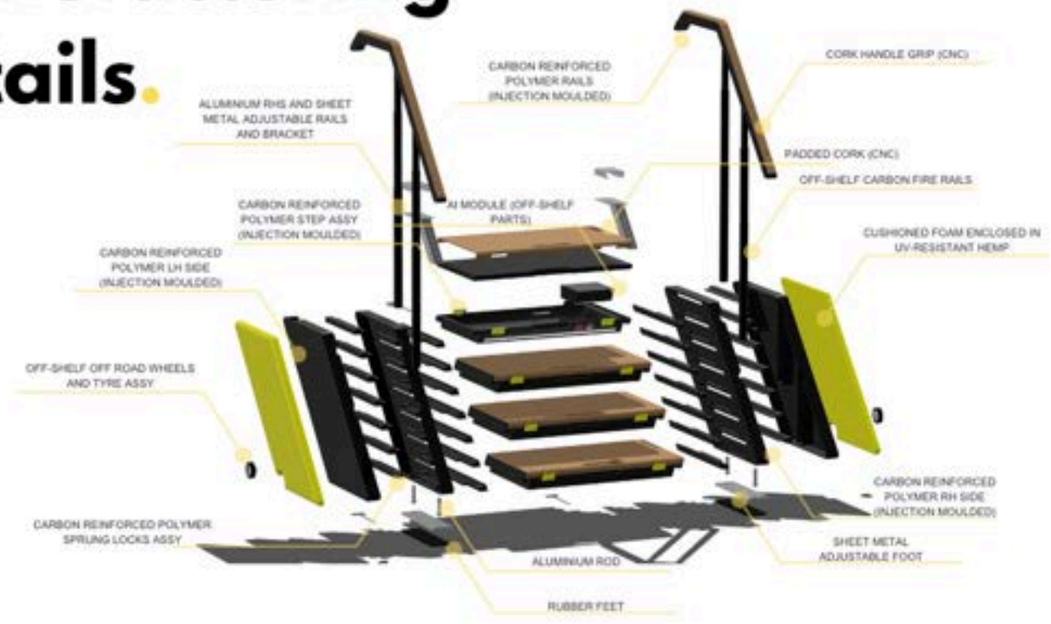
AI step with sensor LED light bar integrated inside

Ventilation louvers on the rear of the powered AI step for cooling

Adjustable stabilising feet for rough, uneven terrain

Customisability for personal preference

Manufacturing Details.



Rhys Duggin - N10997237

FINAL PRESENTATION

RHYS DUGGIN

10/2024