

Rescue on Wheels

A COMPACT COMMUNITY
CARE VEHICLE



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WORLD URBAN FORUM

PROJECT BRIEF

RESCUE ON WHEELS

The “Rescue on Wheels” initiative introduces a beta community care vehicle optimized for narrow-street access. It includes equipment for the treatment and transport of non-critical patients and wheelchair users.

The project’s strategy involves a coordinated trial period with local organizations and official authorities. Upon completion, the vehicle will be developed further, aiming for official approval and subsequent regional or national circulation.



THE VEHICLE NAVIGATING THE STREETS OF ARD AL-LIWA DURING ITS TRIAL RUN

PROJECT FRAMING

General Context & Relevance

The project addresses one of key challenges facing the informal neighborhoods that constitute most of the urban developments in the Global South. Cairo is not an exception; two-thirds of its housing stock is produced informally (Sims 2010). Most of these neighborhoods, the development of which precedes planning, lack basic infrastructure and urban services.

Ard al-Liwa, an informal neighborhood west of Cairo, developed incrementally over four decades on agricultural land, resulting in its illegal status despite private land ownership. Its urban fabric mirrors its origins: former irrigation canals became main streets, and agricultural basins defined the residential block footprints. **The neighborhood is highly resourceful, showcasing its productive capacity through creative local initiatives that compensate for the lack of state-provided public amenities.**



ONE OF THE STREETS OF ARD AL-LIWA

PROJECT FRAMING

Project Positioning & Intervention

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The project positions itself within the paradox of identifying gaps in Ard al-Liwa while actively building upon local capacities and creative solutions. The core aim is to redefine the role of formally trained designers in informal areas. This is to be achieved by analyzing the underlying order of local practices and then proposing a non-disruptive design initiative that improves the quality of life within the existing community ecosystem.

Based on initial analysis, **the team identified the urgent local need for appropriately sized emergency vehicles.** Most residential streets in Ard al-Liwa, built outside planning codes, are extremely narrow (6–8 meters). This width restricts access for standard emergency vehicles, posing significant risks to lives and property. Currently, the neighborhood uses micro-motorized vehicles (such as Tuktuks for passengers and tricycles for goods) for transport within these narrow streets. Through a process of co-design and co-creation, a **proposal is tailored to the specific urban fabric and is able to navigate the narrow streets.**

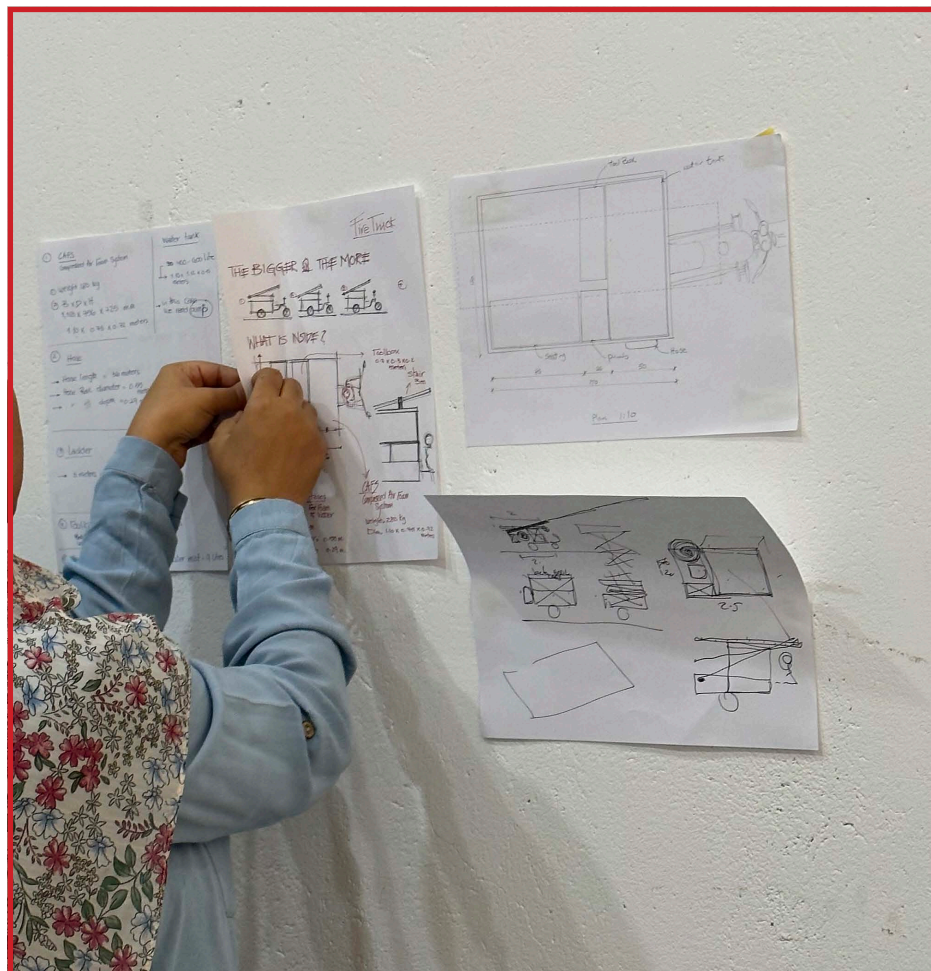


A TRICYCLE SPOTTED IN ARD AL-LIWA TRANSPORTING GOODS

PROTOTYPING

DESIGN WORKSHOP & TESTING

The project launched with a design and prototyping workshop in Ard al-Liwa, enabling direct conversation with targeted local residents. Participants and the core team **synthesized design codes and guidelines using local and international best practices**. The subsequent phase involved optimizing the vehicle's layout and equipment through multiple iterations of sketches and 3D test models. Collective brainstorming informed the refinement, **culminating in a final real-life mock-up**. A schematic operational strategy was also developed, proposing **a collaborative service model with local clinics or organizations** to ensure accessibility & community integration.



SKETCHES AND TEXTS READY FOR GROUP DISCUSSION.



WORKSHOP PARTICIPANTS TESTING THE AMBULANCE'S SPATIAL LAYOUT

COMMUNITY ENGAGEMENT MEETINGS FOR OUTREACH AND FEEDBACK

Throughout the project, **a series of community feedback sessions significantly shaped the design, leading to a functional beta version of the vehicle.**

Following the creation of the initial wooden and cardboard prototype, community representatives were invited to provide crucial input on both technical design and operational frameworks. The first meeting focused on the spatial layout and internal equipment. The second meeting, involving local organizations like the Woman and Society Association & Al-Shar'iya Association, addressed the vehicle's operation and potential for local community management in coordination with official authorities.

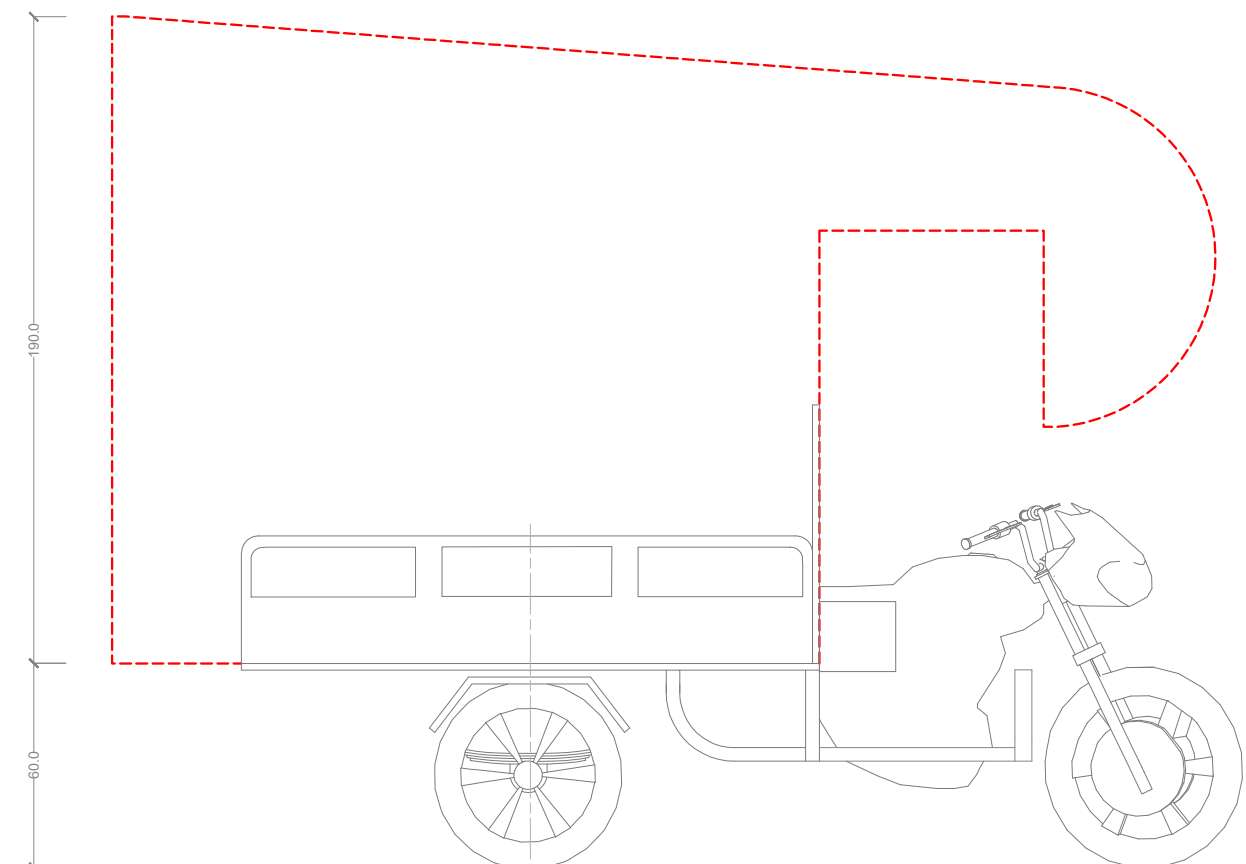
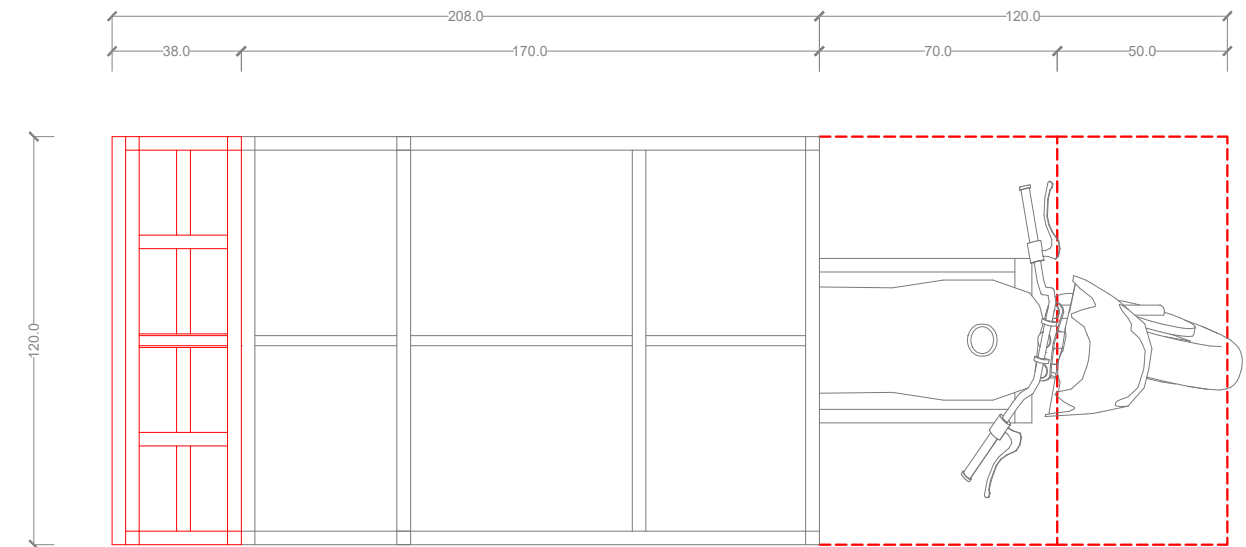
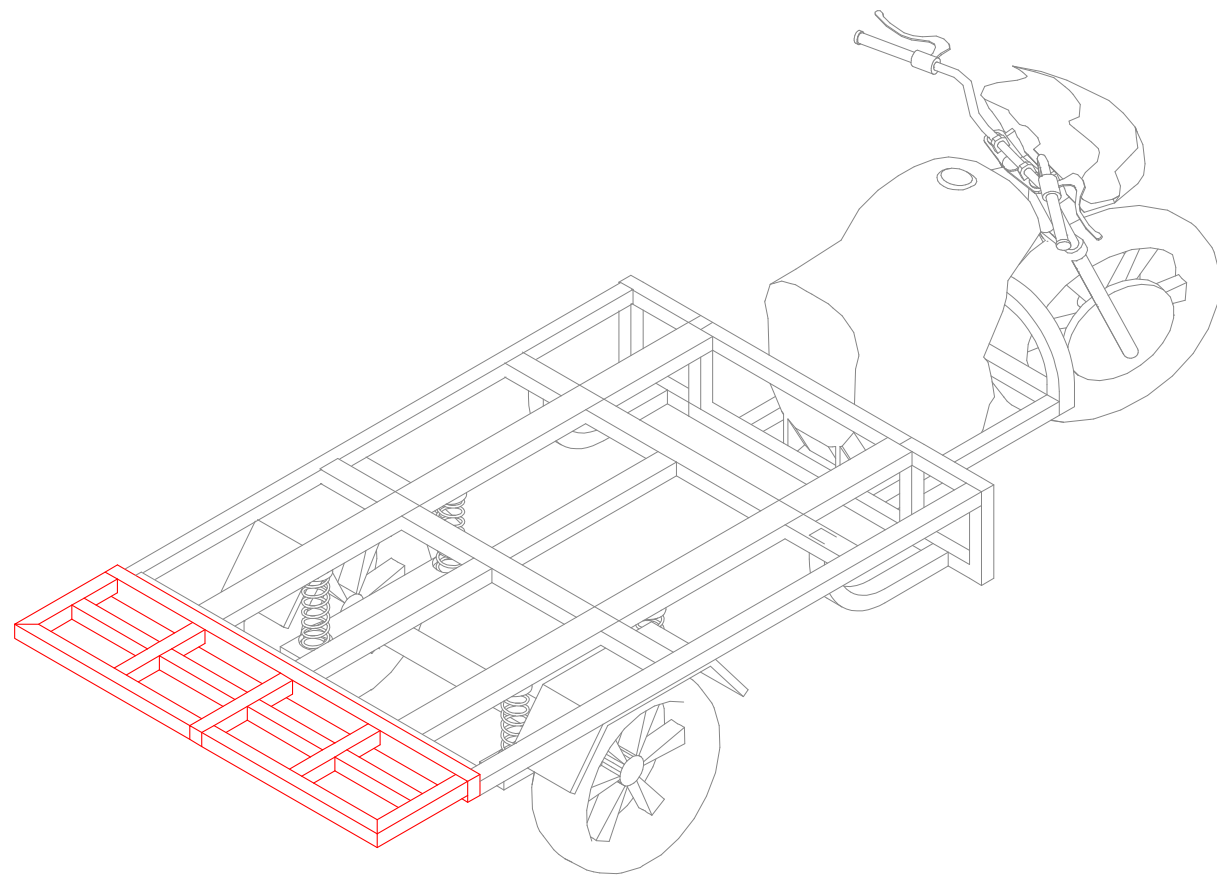


COMMUNITY MEMBERS ENGAGING IN BRAINSTORMING AND GROUP DISCUSSION.

DESIGN DEVELOPMENT

TRICYCLE MODIFICATIONS & ADDITIONS

The vehicle is **built on a modified tricycle base** with a custom shell. The shell's length and height are extended to maximize interior space while **maintaining a standard width to easily navigate narrow streets**. The **length was increased to accommodate a standard-sized stretcher**, and the height was modified for **average paramedic clearance**.

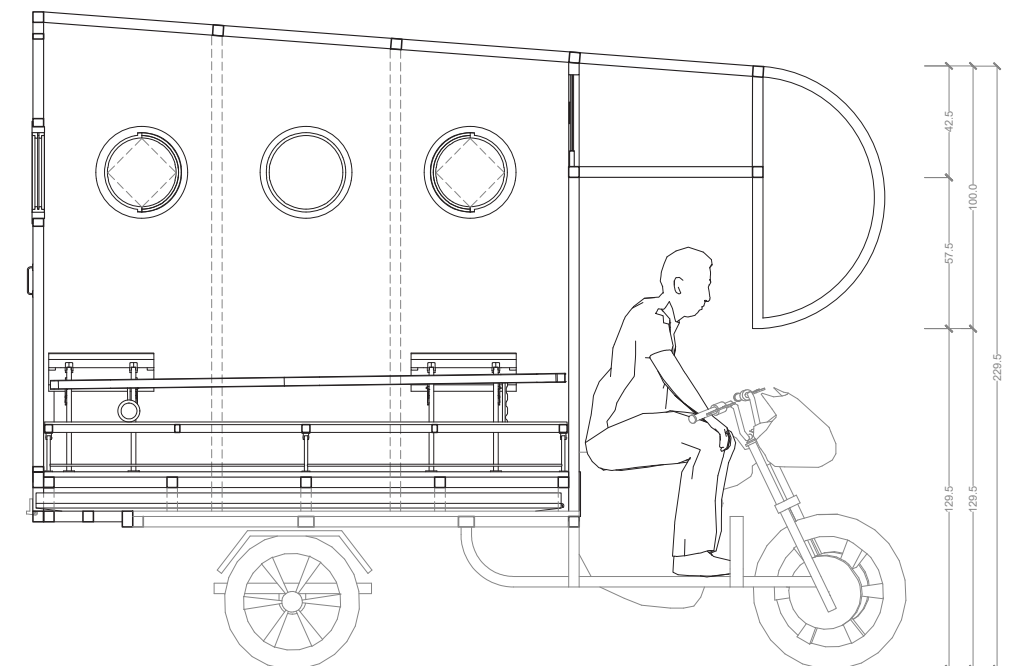
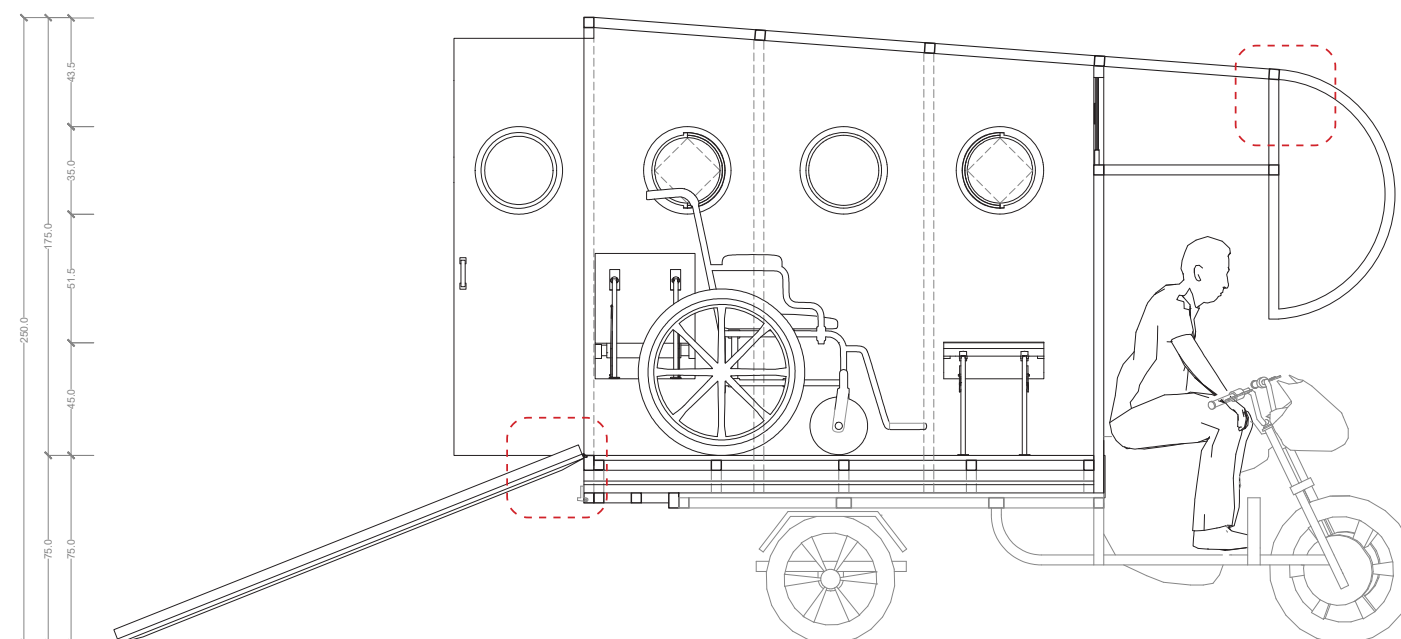
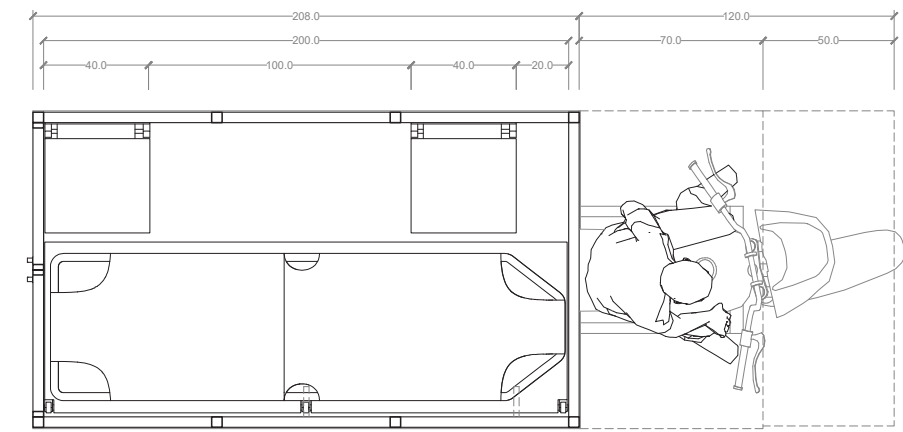
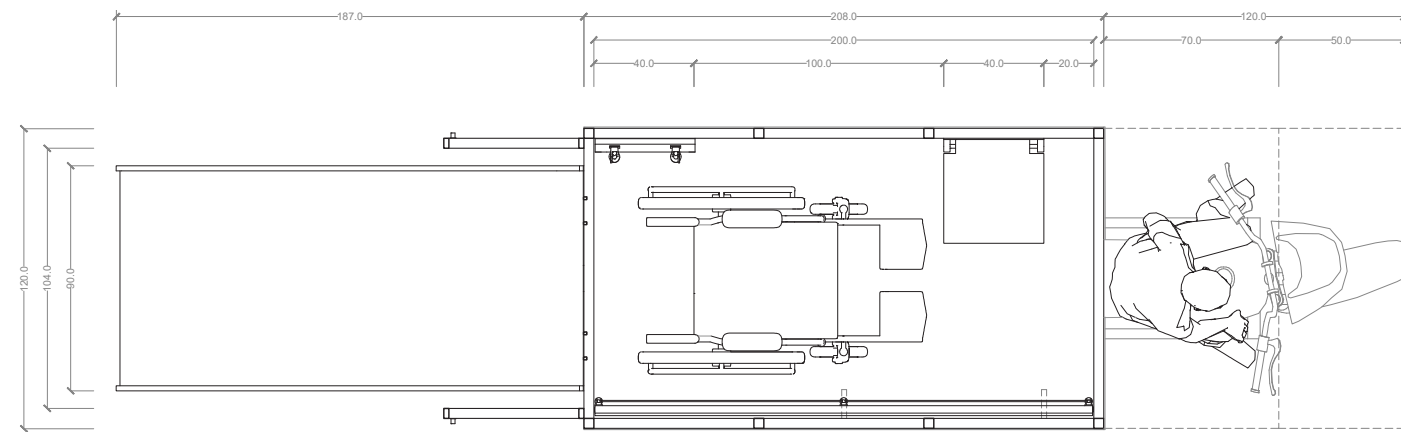


DESIGN DEVELOPMENT

SPATIAL LAYOUT

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A versatile vehicle was designed with **a well-lit compartment, basic mechanical ventilation and foldable furniture to provide space** for a paramedic, a companion and a patient in either a stretcher or wheelchair, while an extended upper storage unit is used to place basic non-electrical medical equipment. A ramp was integrated to provide accessibility.



SCENARIO 1 OF ACCOMODATING A WHEELCHAIR

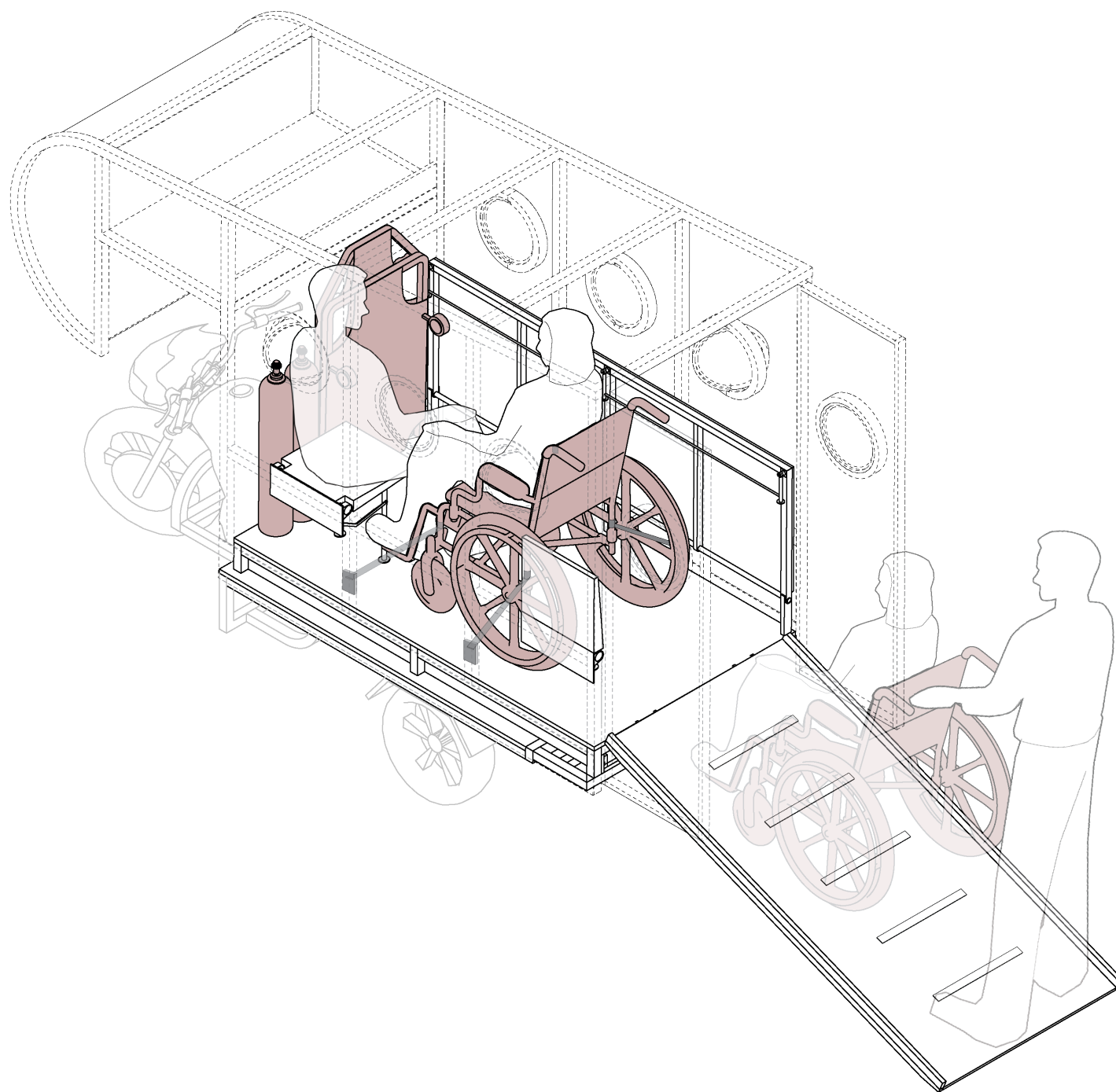
SCENARIO 2 OF ACCOMODATING A STRETCHER

DESIGN DEVELOPMENT

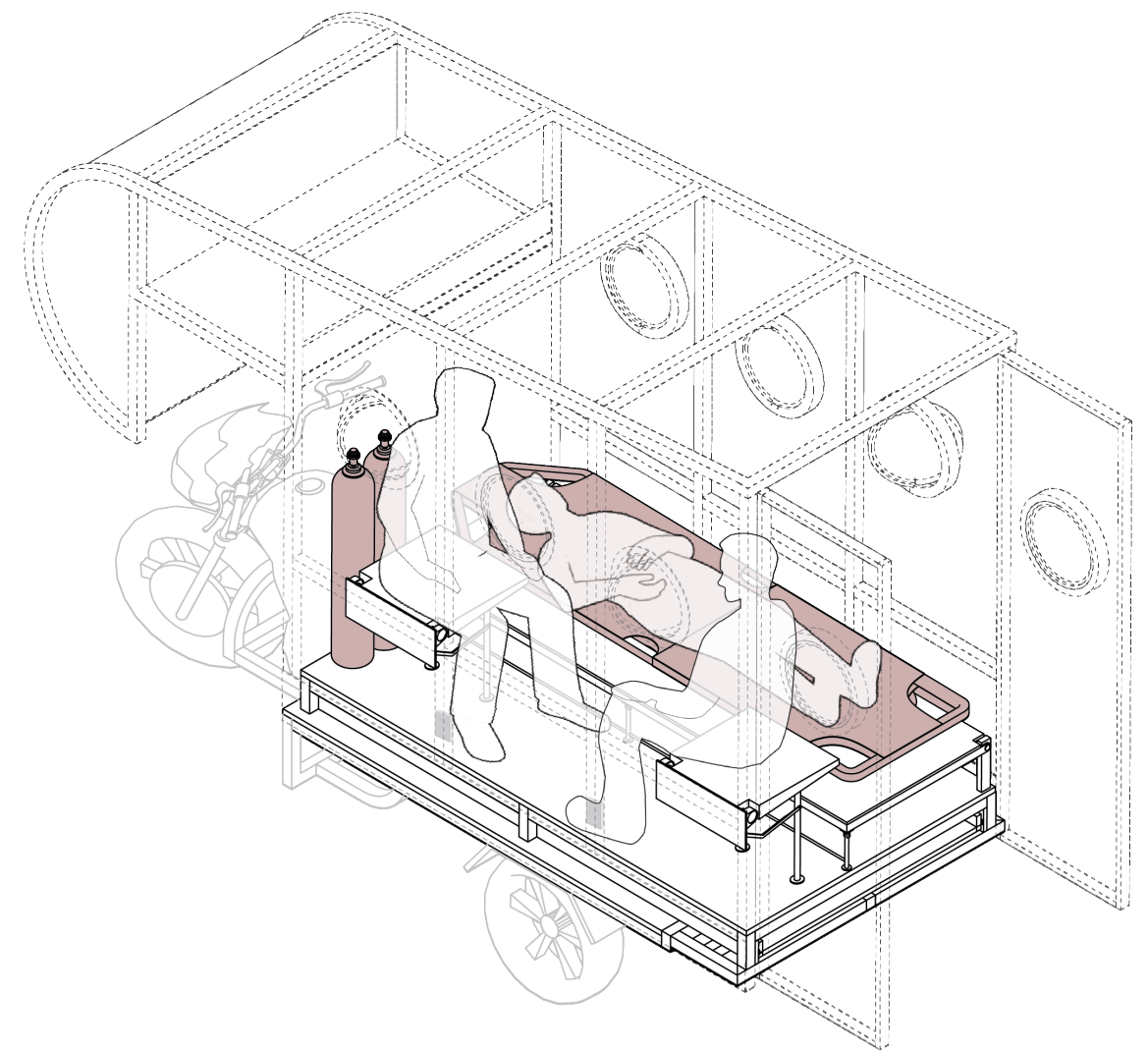
SPATIAL LAYOUT ILLUSTRATED

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In **Scenario 1**, the vehicle is set up to **transport wheelchair users**. The stretcher platform is folded and locked, creating a space for a wheelchair to easily board.



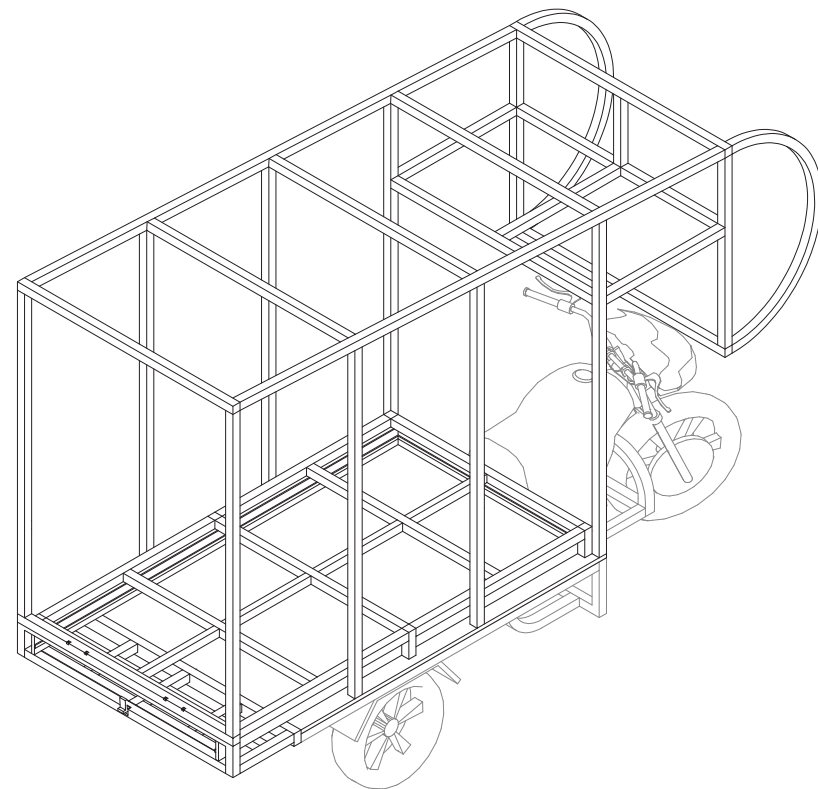
In **Scenario 2**, the vehicle **can accommodate a stretcher** placed and fastened to a foldable, raised platform.



MANUFACTURING

BUILDING THE VEHICLE'S BODY

Although the project was less industrial than their typical output, the manufacturing facility fully supported the unique production, modification discussions, and detailed finesse required. **This collaborative, trial-and-error process involved continuous refitting and editing.** The design team played a crucial role, **bridging the gap between their novel vehicle design experience and the manufacturer's extensive industrial background.**



BUILDING OF THE METAL STRUCTURE ON TOP OF THE BASE

MANUFACTURING

CLADDING THE VEHICLE'S BODY

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A metal frame was first constructed and securely attached to the vehicle's base. The manufacturer advised the team to use **polyurethane sandwich panels** for the vehicle's top shell, as these materials provide **proper heat and fire insulation**. The sandwich panels were then used to clad the frame, **creating a lightweight, durable, and well-insulated compartment ideal for edical use**. This material choice ensures a stable interior environment, protecting both sensitive medical equipment and the patients being transported.



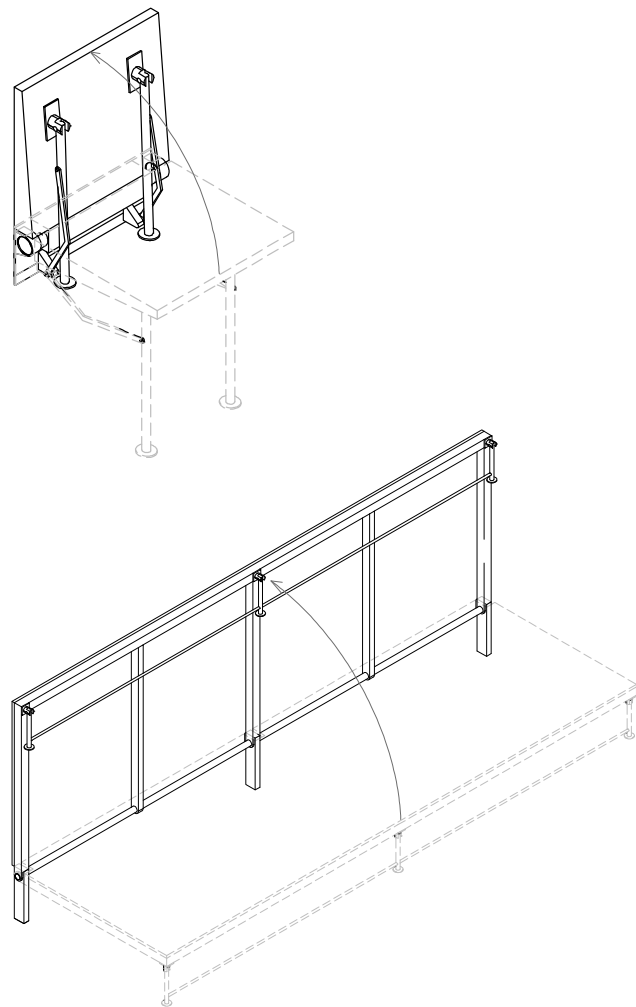
CLADDING THE METAL STRUCTURE

MANUFACTURING

FOLDABLE ELEMENTS

11

A wall-mounted, foldable seating and a stretcher platform were integrated in the vehicle as a critical **space-saving strategy**. Foldable chairs for the paramedic and a family member ensure safety and comfort during transport, while **quickly collapsing to maximize floor space** for patient care or loading equipment. The foldable platform allows a stretcher to be securely placed at a usable height, then folds flat against the wall, maintaining a flexible interior layout.



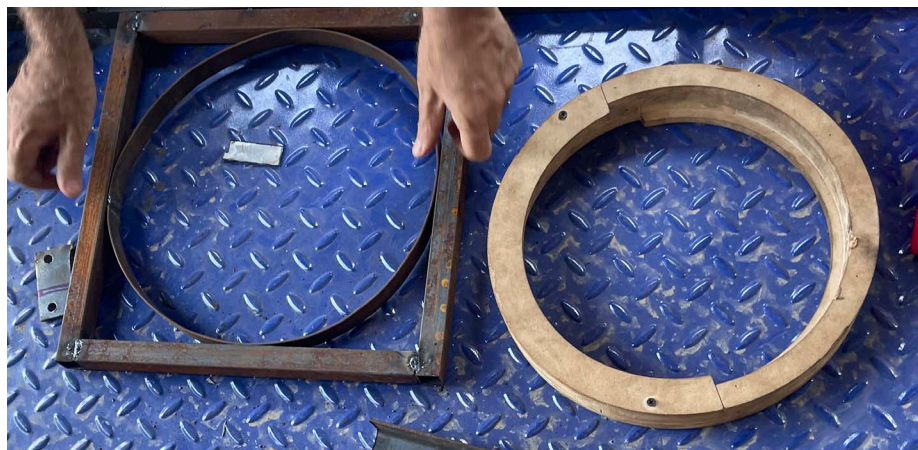
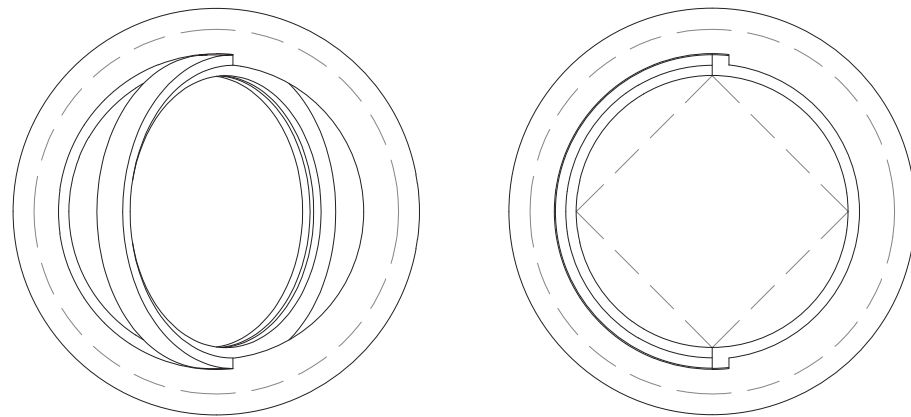
THE INTERIOR OF THE VEHICLE WITH THE FOLDABLE ELEMENTS INSTALLED

MANUFACTURING

WINDOWS DESIGN & PRODUCTION

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The pivoted window was produced through a process of a trial and error. This involved a series of tests and **adjustments to ensure the window mechanism operated smoothly and sealed properly** against the elements. The pivoted circular windows **add to the unique visual identity** which creates a clearly recognizable and dignified rescue vehicle for the community.



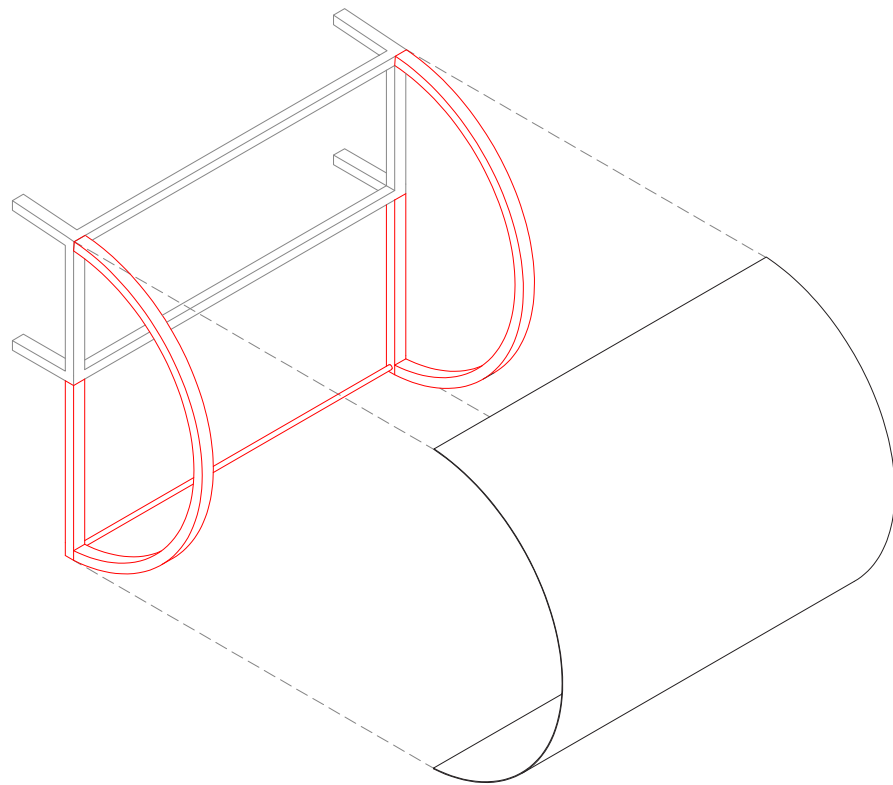
CIRCULAR WINDOW

MANUFACTURING

WIND SHIELD DESIGN & PRODUCTION

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A **curved windshield** was added to protect the **driver from sun and potential accidents**. Both the windshield and the circular window were **manufactured by local craftspeople in Ard al-Liwa, integrating them into the process**. These craftspeople created the windshield's metal structure and acrylic cladding. The vehicle's metal body manufacturer then added an extra metal piece to ensure the locally produced windshield could be properly inserted.



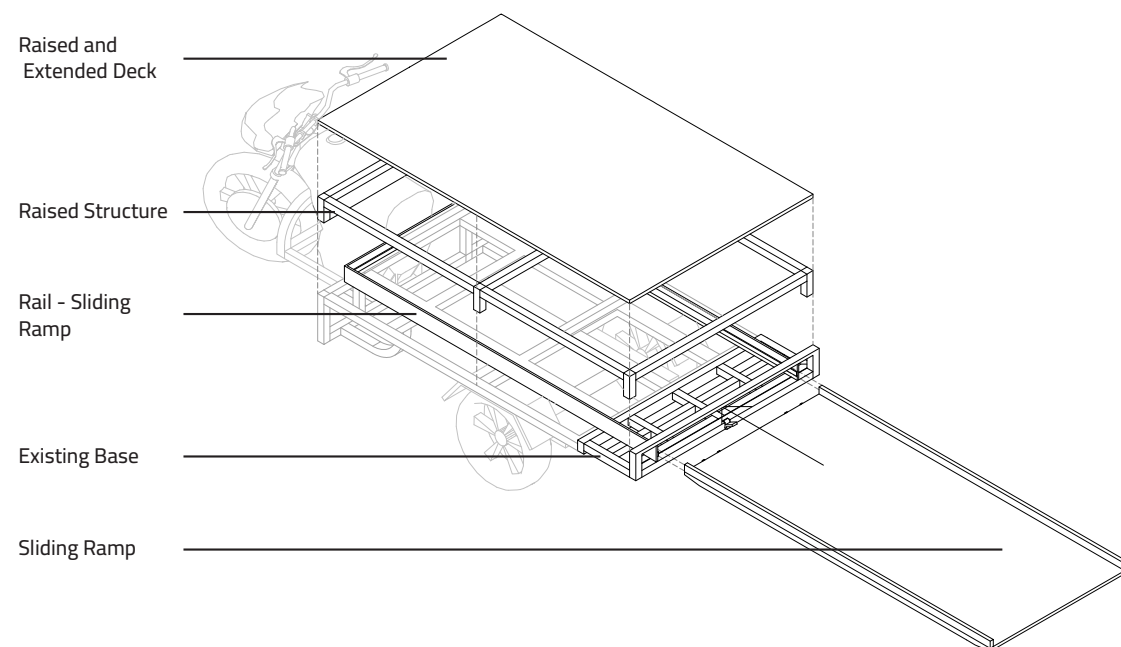
PRODUCTION OF THE WIND SHIELD IN ARD AL-LIWA

MANUFACTURING

RAMP DESIGN & PRODUCTION

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The manufacturer built the ramp, beginning with a metal frame and then cladding it with **a galvanized shaquered steel sheet with a non-slip surface**. This design choice was made to **minimize slipping and increase durability**. To store the ramp, a vertical compartment was built on the tricycle's base, allowing the ramp to slide in and out easily. Two handles were also added to the ramp for easy handling. As a final detail, **metal studs were included on the ramp's surface to prevent wheels from slipping backward**.



PRODUCTION AND INSTALLATION OF THE RAMP

MANUFACTURING

TRICYCLE FINALIZATION

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The manufacturer delivered the tricycle **fully painted in the brand's colors and structurally complete.** It was then transported to the team's office in Ard al-Liwa, where a craftsman applied the name and logo.



THE INTERIOR OF THE VEHICLE

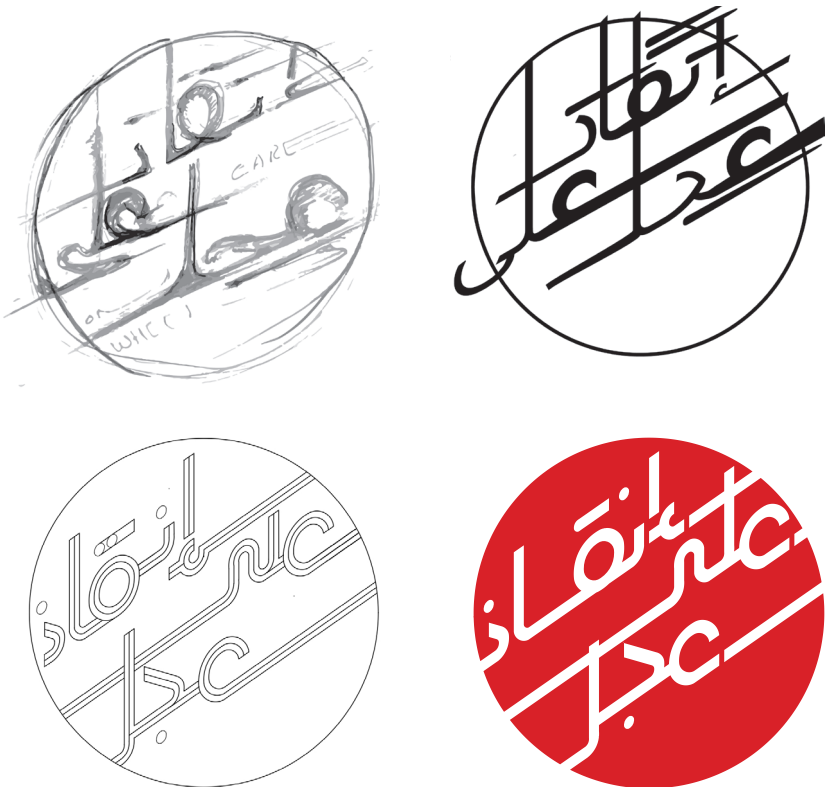


TRANSPORTING THE VEHICLE TO ARD AL-LIWA

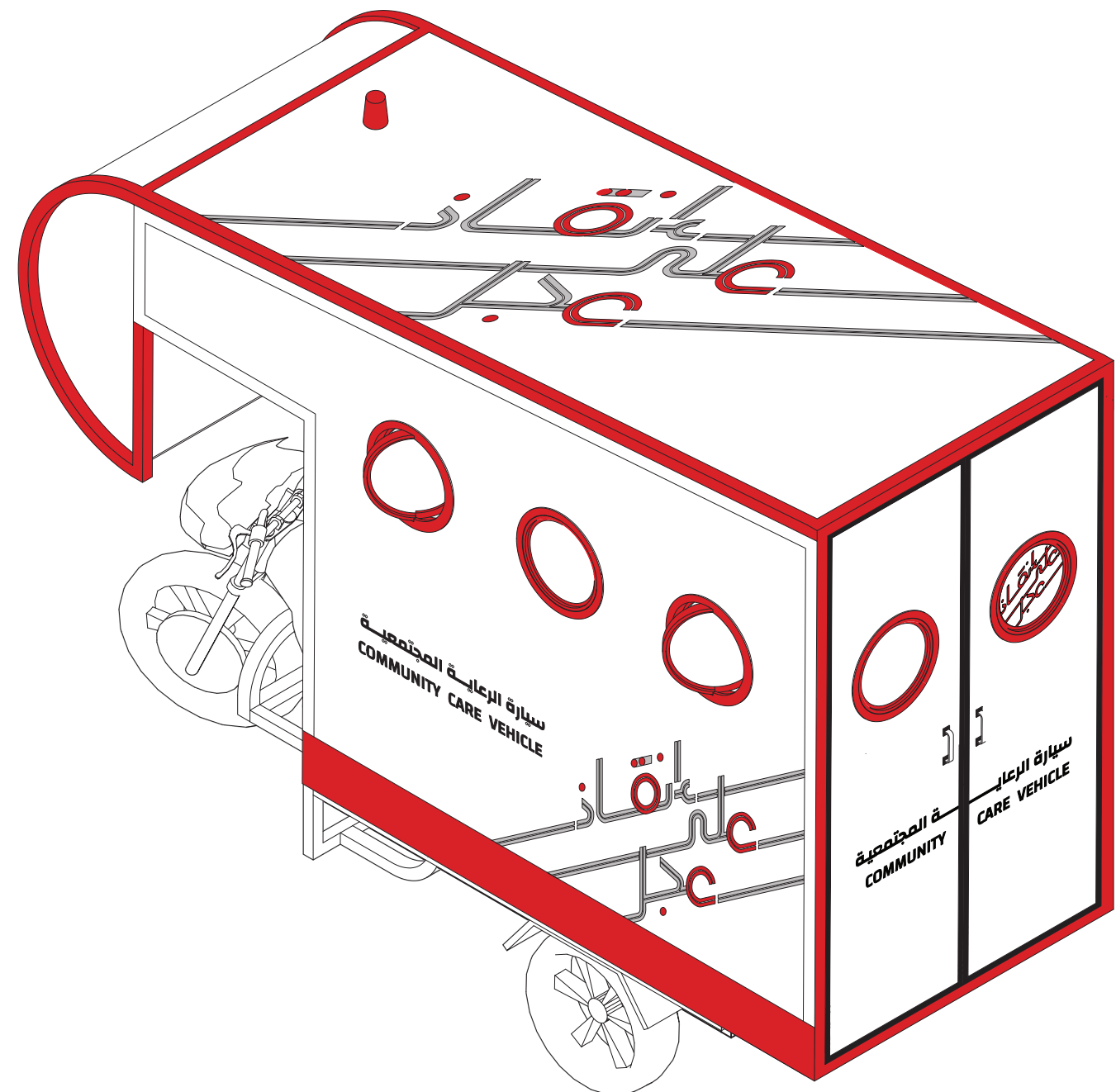
VISUAL IDENTITY

LOGO AND VEHICLE BRANDING

The project team prioritized creating **a visually distinct and dignified vehicle, countering the perception of it being a mere goods carrier.** They selected red for its high visibility and association with ambulances in Cairo, ensuring the new transportation would be recognizable and community-approved. For the brand identity, they created **a logo based on the circular windows.** The vehicle was named **“Rescue on Wheels,”** which leveraged a clever **double meaning in Arabic: the word for “wheels” also implies “in a hurry.”** This dual meaning was reinforced in the final logo, where the Arabic calligraphy was stylized to visually suggest the motion of turning wheels, communicating both urgency and mobility.



LOGO ITERATIONS AND DEVELOPMENT

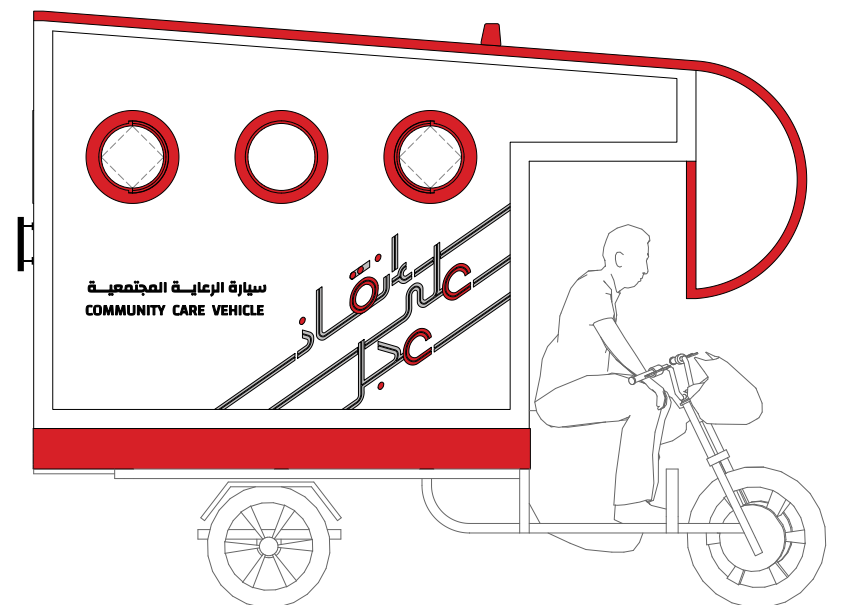
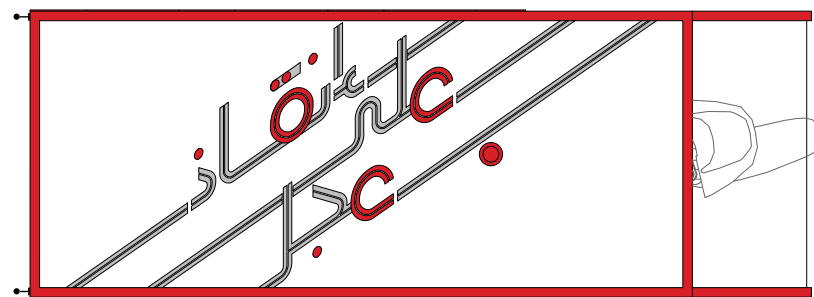


TESTING THE VISUAL IDENTITY ON THE VEHICLE

VISUAL IDENTITY

VEHICLE IN ACTION

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TESTING THE VISUAL IDENTITY ON THE VEHICLE

TEST DRIVING THE VEHICLE IN ARD AL-LIWA

PERFORMANCE EVALUATION

OPERATIONAL TESTING WITH LOCAL PARTICIPANTS

The strategic placement of the tricycle in Ard al-Liwa serves as an invitation to encourage curious neighbors and passersby to stop, engage, and interact with the ongoing tests. **The tricycle acts as a visual hook, transforming the private testing area into a more accessible and community-oriented space**, thereby increasing participation and feedback.



LOCAL CHILDREN TESTING THE STRETCHER



LOCAL RESIDENTS TEST DRIVING THE VEHICLE IN ARD AL-LIWA

MODIFICATIONS

MECHANICAL MODIFICATIONS

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The test drives in Ard al-Liwa revealed **critical performance flaws**. The vehicle displayed instability during U-turns, leading to unsafe leaning that jeopardized both the driver and passengers. Additionally, the ride was rough, causing considerable bouncing and discomfort over typical road bumps. Recognizing these safety and stability problems were outside their core competency, the team consulted automotive engineering professors. This external expertise ensured the necessary technical adjustments could be made to resolve the critical issues before final deployment.



TEST DRIVING THE VEHICLE FOR OBSERVATION AND MODIFICATIONS

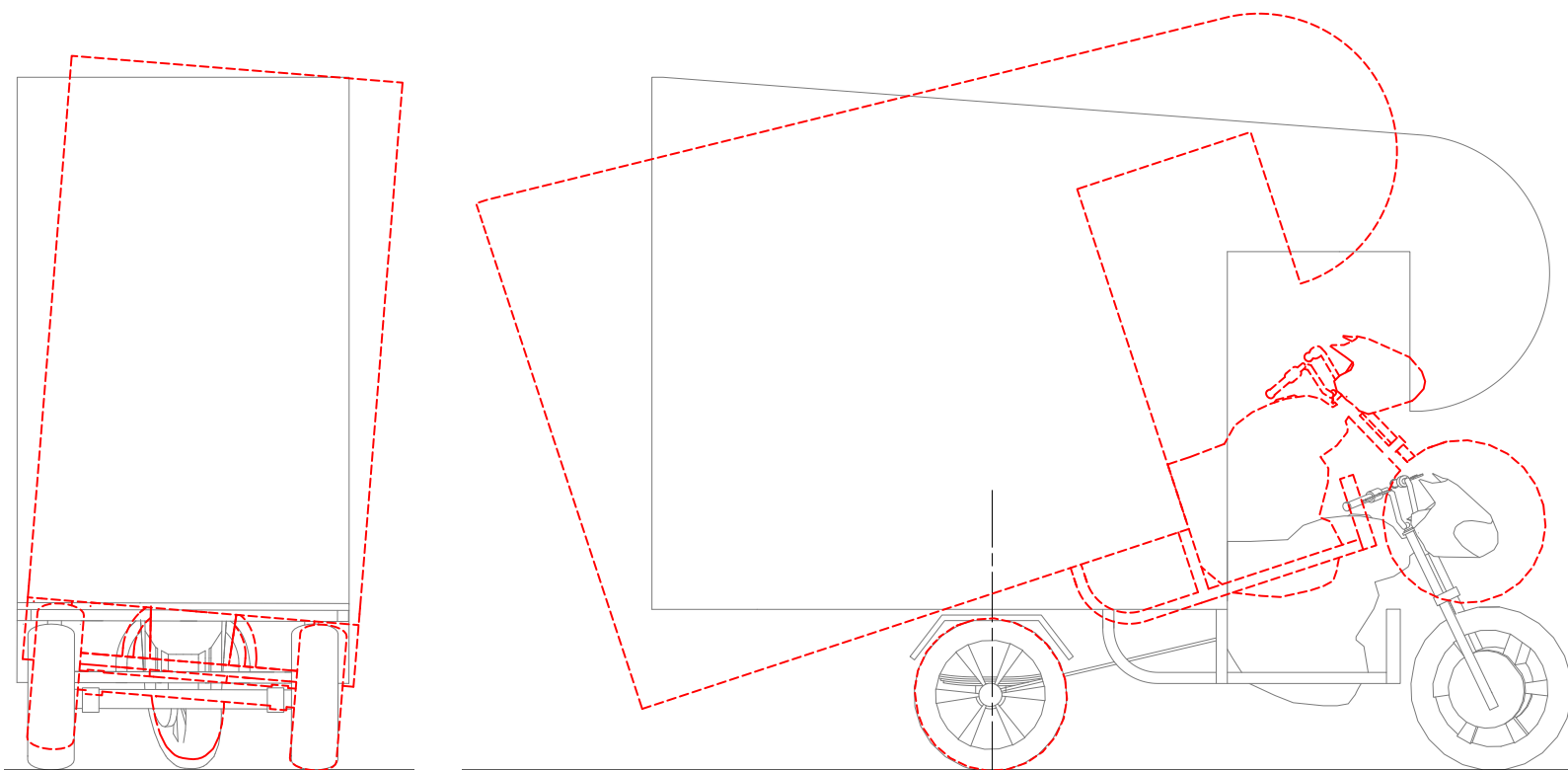
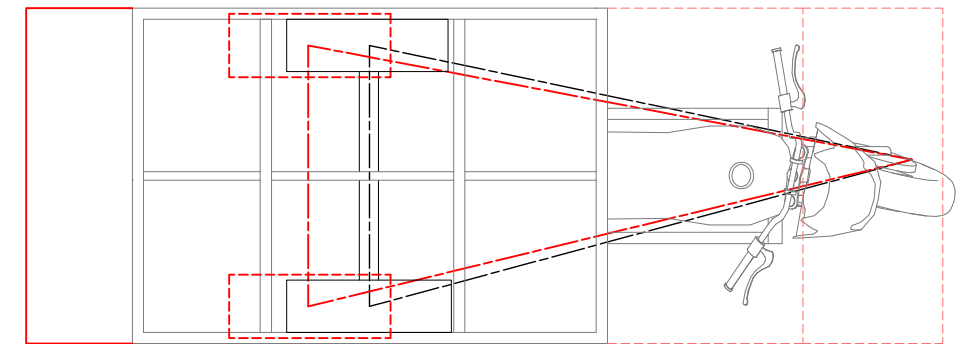


EXPERTS WEIGHING AND MEASURING THE LOADS OF THE VEHICLE

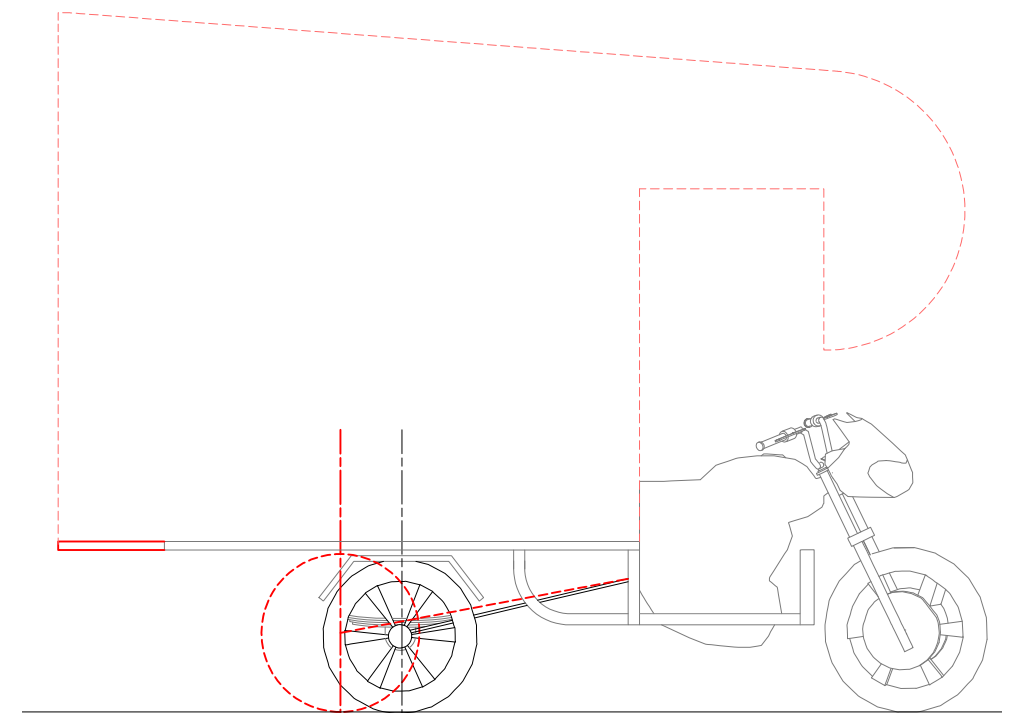
MODIFICATIONS

MECHANICAL MODIFICATIONS

The aforementioned issues were caused by the extension of the base's length which resulted in a **shifted center of gravity** and the extension of the height **affected the lateral stability**. The professors conducted a detailed analysis of the tricycle's performance and total weight. Critical measurements were taken, including the weight distribution on all three wheels when the vehicle was loaded to its full capacity. This data was essential for understanding the vehicle's altered center of gravity and determining the necessary structural fixes. The **primary solution involved shifting the rear wheels further back** to improve stability. The team investigated using wider wheels and calculated **new safe speed limits** tailored to the modified design.



THE ISSUE OF IMBALANCE AND INSTABILITY OF THE VEHICLE



THE PROPOSED SOLUTION TO FIX THE IMBALANCE

The 12th **World Urban Forum** (WUF 12), hosted by the United Nations Human Settlements Programme (UN-Habitat), recently convened in Cairo. Recognizing a unique opportunity to **boost their visibility with both local and international organizations**, the team made the strategic decision to participate. They successfully showcased the Community Care Vehicle at the Urban Expo, which facilitated a particularly engaging discussion with the Executive Director of the Egyptian Red Crescent.



