

A Collaborative Approach to Designing Post-Disaster Living Spaces After the 2023 Earthquake in Türkiye

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Abstract *In February 2023, a destructive earthquake struck southern Turkey and Syria, leading to widespread devastation and the displacement of millions. I-AM, in collaboration with various organizations, embarked on a corporate social responsibility initiative to design healing living environments aimed at fostering solidarity and community among survivors. Their inclusive design approach, utilizing the co-design methodology, successfully addressed the diverse needs of survivors, categorized into sheltering, basic needs, social needs, and recreation. This approach facilitated active stakeholder participation and is poised to serve as a valuable model for future post-disaster design projects, promoting collective, sustainable, and healing living spaces for survivors.*

Author keywords *post-earthquake; container city; co-design; participatory design; stakeholder*

Introduction

In February 2023, a massive earthquake hit southern Turkey and Syria, affecting a very large area and leaving over 50,000 people dead, with 3.3 million people displaced. The International Organization for Migration estimated over 2.7 million people were made homeless (UN Office for the Coordination of Humanitarian Affairs, 2023). The disaster prompted a response from governmental and non-governmental organizations alike, with the primary objective of creating a safe living environment for the survivors. After an earthquake of such serious destructiveness, the immediate mobilization of both government institutions and non-governmental organizations for search and rescue efforts and urgent shelter solutions led to the emergence of societal solidarity, enabled especially by the power of social media. As Hilhorst (2013) argues, crisis response, as well as the crisis itself, is shaped by social dynamics and should never be analyzed in isolation from the society itself. After the earthquake, both individuals and institutions from diverse

segments of Turkish society offered assistance in various capacities, aligning with their respective capabilities.

Turkey, being a region with intense seismic activity, has experienced earthquakes of varying destructiveness for centuries. Following the 1999 Marmara earthquake and the constructional and social damage it left behind, a societal debate emerged regarding the destructiveness of earthquakes being attributed not to the earthquake itself, but to the lack of earthquake-resistant construction. The extensive damage and high mortality rate after the February 6 earthquake, the most severe in Turkish history, prompted a societal discourse on the human dimension of design and, consequently, its role as a crisis-inducing factor. Fry & Nocek (2021, p. 4) frame their perspective for design and planetary crisis as follows:

“The challenge, which has so far not been met with an adequate response, is to see how this planetary crisis puts design itself in crisis: human and non-human ontologies cannot be reimagined without rethinking the very being of design. In short, design is immanent to crisis.”

Being both members of the Turkish society and the design community, we, as I-AM experience design agency, wanted to embark on a quest for a solution by leveraging our capabilities, feeling corporate responsibility towards this significant issue. Rezai (2021) states that within the context of design activism, the awareness of the designers on societal problems is established through being part of the change. Recognizing the responsibility to contribute to addressing the most severe disaster in our history and actively seeking solutions, we initiated a collaborative post-crisis project aimed at designing healing living spaces that would foster a sense of solidarity and community among the survivors.

Discussion

Following the devastating disaster, several governmental and non-governmental organizations both in Turkey and worldwide rushed to help the affected people in the area. After the immediate response to help the survivors get out of the wreckage, the second immediate problem to be solved was the temporary accommodation of the survivors.

The Izmir Chamber of Commerce took initiative to develop a container project for the earthquake zone to overcome the challenges related to the time required for the delivery and installation of ready-made containers, the need for substantial equipment, the logistics involved, and uncertain locations. This project was designed to fulfill the immediate housing needs of the survivors while minimizing infrastructure necessities. After being informed of the project's commencement in conjunction with the Izmir Chamber of Commerce, the IDEALIST Interior Design Association reached out to extend their support. They expressed their intention to

contribute to the design and manufacturing of interior furnishings for these containers. As IDEALIST is an interior design association whose purpose is “to work towards the development of interior architecture, from education to professional life, in accordance with international standards and an innovative approach”, they immediately reached out to their members and business associates and brainstormed ideas on how to create livable spaces for the earthquake area. Various interior design agencies registered to IDEALIST Association, one of which is I-AM, volunteered to design different areas of the neighborhood, taking into account their own competencies and experiences in doing so.

As I-AM, we took charge of the design of the interior living spaces of the containers and initiated the project's development into a master plan that can be utilized not only for this particular disaster but also for potential future disasters. While pursuing this, we deemed it suitable to view this project not only as a straightforward interior design task, but rather as an integrated social design project that incorporates relevant social cooperatives and non-governmental organizations. The literature suggests that participatory and collaborative approaches in social design practices play a vital role, offering methods which promote a mutual learning environment through the active engagement of all relevant participants (Gürdere Akdur, 2023).

Furthermore, the importance of these practices lies in their capacity to extend beyond the co-design of shared outcomes. They entail a distinctive approach to surveying and expanding multiple potential pathways for sustainable change within broader contexts of social transformation (Smith & Iverson, 2018). With that in mind, we collaborated with other stakeholders including the Needs Map Social Cooperative; IDEMA, an entrepreneurship initiative for socio-economic development projects; and Center for Spatial Justice, a social collective who made it their “duty to produce, collect and share qualified, innovative and public knowledge on space through a transdisciplinary approach” (Center for Spatial Justice, 2024). Various design teams that were members of IDEALIST Interior Design Association also participated in the project through the initiation of the IDEALIST. Together with all the stakeholders, especially NGOs, we defined the list of the possible needs and reviewed the global standards in post-disaster living spaces.

The Joint Living and Community Spaces Strategic Approach and Concept Design report, a result of the collaborative effort by KAF Komün, Aposto, Neol, and ATÖLYE in the aftermath of the earthquake, brought forth the following themes: fostering community bonding through essential needs like daily hot meals and clean water, creating shared community spaces through simple and minimalistic spatial solutions, and enhancing participation through supporting functions such as psychosocial care, healthcare services, and women's support circles (KAF et al., 2023).

One of the most crucial insights we needed to acquire before entering the design process of the project was the psychological impact of the disaster on earth-

quake survivors. World Human Relief, a nonprofit and non-governmental organization, plays a crucial role in conducting trauma-focused psychosocial support activities in disaster-stricken areas through expert collaborations. Valuable insights gathered by clinical psychologist Dr. Ezgi Deveci, a clinical psychologist affiliated with World Human Relief who conducts studies within community living spaces in such contexts, made us even more strongly aware of the vital nature of our efforts in container cities. These insights are from Ezgi Deveci's perspectives gained through her interviews and observations with earthquake victims in the affected area, communicated to us personally. The insights underscore the profound impact of environmental conditions, giving rise to a myriad of physical, psychological, and social challenges.

Some of these insights can be summarized as follows:

1. **Extreme Climate Conditions:** Due to the region's extreme air temperatures, there is a pressing need not only for indoor shelter areas but also for outdoor living spaces to ensure comfortable living conditions.
2. **Privacy Challenges:** The closely spaced living units, which lack personal space, present challenges in preserving privacy. This situation hinders social interactions and contributes to conflicts among families. Additionally, findings from case interviews conducted by Deveci reveal that due to the conservative nature of the region's residents, women and young girls are at risk of domestic violence, especially when leaving their living units without permission or interacting with their boyfriends.
3. **Absence of Social Spaces:** Notably, designated areas for women and young individuals to gather, interact, engage in communal activities, or participate in productive endeavors are absent in the post-earthquake environments. This limited access to social support can be considered a contributing factor to the decline in the well-being of individuals who already have limited resources within container facilities, perpetuating traumatic symptoms (Olff, 2012; Stephans & Long, 1999; Somasundaram and Van De Put, 2006).
4. **Complications with Shared Facilities:** The design and arrangement of communal bathrooms and toilets have led to declining hygiene standards and reduced usage, as people feel their privacy is safeguarded inadequately. This aspect significantly contributes to the deterioration of both physical and psychological health (Dückers et al., 2017).

In the literature on psychological support following major disasters, the top priority consistently revolves around relocating individuals to a secure environment where they can find solace, have their basic needs met, and seek comfort in each other's company. The fulfillment of these basic needs and the fostering of communal bonds are crucial initial steps toward recovery (Miller & Rasmussen, 2010; Rao, 2006). In conclusion, it is imperative to emphasize that reimagined living spaces serve as in-

valuable tools capable of significantly improving individuals' psychological well-being and facilitating their journey to post-traumatic recovery.

The Design Process

Following the insights we acquired upon carefully reviewing the literature, we based our designs on the container plans provided by the Izmir Chamber of Commerce. Container cities in post-disaster zones generally appear as spaces urgently arranged side by side, intended for the benefit of a large number of people, with public toilets placed outside living units, which is unsafe especially for women and children (Figure 1). The existing containers are planned like dormitory rooms with as many bunker beds as possible, and not as adequate living spaces. There are not enough storage units, tables and chairs, and study areas especially for children, which are necessary for medium-long term life. Furthermore, while examining the sample containers previously used in various earthquakes, we observed and studied how people attempted to personalize those spaces, analyzing how individuals tried to customize these places both functionally and through design contributions.

Figure 1: Existing Container Cities in Post-Disaster Zones. Photo: AA.



We formed our “how might we” question as “how might we make the urgent necessity of ‘living together’ in post-disaster zones more comfortable and personalized?”. Taking this into consideration, we shaped our design approach as follows:

- Creating sustainable, collective, healing living spaces that nurture solidarity and companionship.
- Establishing flexibility within the modular and convertible structure of the containers, both internally and in relation to each other.
- Creating neighborhood-scale spaces that address location-based needs by diversifying shared-space functions.
- Defining zones where users can express themselves alongside their vital needs, allowing for personalization.

Towards defining our design approach for life in container areas, we centered our ideas around keywords such as togetherness, gathering, and protection. We based our design principles on the prominent aspects highlighted in the existing research. These aspects included personalization, privacy, ergonomics, socialization, security, and sustainability.

We categorized the needs list into four groups:

1. **Sheltering:** Living modules (for 4, 5, 6 people), courtyard, garden, toilet/bathroom.
2. **Basic Needs:** Kitchen (cooking & dining), laundry (washing, drying).
3. **Social Needs:** Education (study, library), children (play, workshop).
4. **Recreation:** Sports facilities, children's playground, activity area.

Design Outcomes & Expansion Principles

Following the immediate aftermath of the earthquake, the authorized agency appointed by the government, the Disaster and Emergency Management Presidency (AFAD) which operates under the Ministry of Interior, concurrently initiated the relocation of survivors to existing container cities alongside search and rescue efforts. According to data published by the Anadolu Agency as of April 24, 2023, following the February 6 earthquake, approximately 145,000 earthquake survivors were accommodated in around 75,000 containers across Turkey. (Şahin, 2023).

In developing our settlement plan, our approach was based on the emergency shelter standards outlined in the Emergency Handbook published by the United Nations High Commissioner for Refugees (Table 1).

Our aim for the upcoming settlements was to accommodate as many families as possible at the highest level of comfort possible. The project also aimed to have certain expansion principles in place, as it was intended to be applied to areas of various sizes that partnering NGOs might find in the region. Additionally, we aimed at developing a master plan that could be utilized in case of other potential disasters. Life units were designed to add to one another and scale up to neighborhood and town levels. The smallest unit, a cluster, consists of 16 containers and is intended to ac-

commodate between 64 and 80 people. 16 clusters together form the neighborhood unit which has the capacity to house approximately 1,000 to 1,200 people. When four neighborhoods come together, they transform into a town accommodating 4,500 to 5,500 people with 1156 containers (Figure 2).

Table 1: Indicative modular planning units (Source: UNHCR Emergency Handbook)

Module	Structure	Approximate number
Family	1 x family	4 - 6 persons
Community	16 x families	80 persons
Block	16 x communities	1,250 persons
Sector	4 x blocks	5,000 persons
Settlement	4 x sectors	20,000 persons

Figure 2: Growth Program. Plan: I-AM.



Sheltering

We started with the idea of optimizing the usage areas of the existing containers within the current layout, both in terms of interior and exterior spaces. Due to the

restricted volume of interiors, we were aware that we needed to create a flexible interior design to cater to the varying needs of different numbers of people, such as watching television, storing food and belongings, and studying.

In container cities, the concentration of wet facilities in a specific location poses both security and hygiene issues, especially for women and children (Association of Public Health Specialists – Turkey, 2023). We worked on ensuring that every family, no matter how small, has access to their own bathrooms. The existing containers of Izmir Chamber of Commerce did not include wet facilities, so we designed an H-shaped layout, allocating an additional fifth container for every four containers, dividing it into four parts, and providing a separate entrance from each container, thus creating a private bathroom and toilet area for each family (Figure 3). In doing so, we didn't use more containers compared to the existing container city plans; in fact, we integrated the containers that would serve as shared wet facilities into our layout as personalized bathrooms. Moreover, we aimed to facilitate construction processes such as wastewater collection and wastewater separation by placing H-layout container units in a linear arrangement.

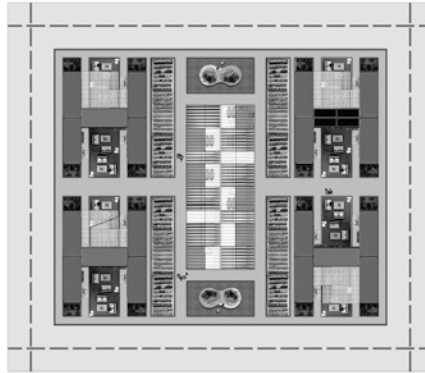
Figure 3: House Types. Plan: I-AM.



One significant reason for proceeding with such a layout was the intertwining of outdoor and indoor living in the Southeastern Region of Turkey. Faiz Büyükçam and Zorlu suggest that the notion of privacy, along with factors such as the climate and topography, has played a role as a socio-cultural element in shaping traditional housing in the region. They particularly emphasize that the influence of the concept of privacy on housing can be observed across various aspects, including spatial organization, facade characteristics, and the usage of exterior spaces as courtyards (Faiz Büyükçam & Zorlu, 2018). Accordingly, we aimed for a culturally-informed design that would inspire the inhabitants to continue their own lifestyles in our container neighborhood. Furthermore, the tradition of large families living together in this region with shared amenities correlates with land ownership (Ökten, 2006). Basing our approach on this insight, we wanted to place the containers facing each other with a courtyard in a way that would be closer to this lifestyle. By creating spaces where relatives can live in close proximity, we emphasized the importance of continuing solidarity inside the families (Figure 4) (Figure 5).

Figure 4: Cluster with H Modules. Plan: I-AM.

Cluster with H modules



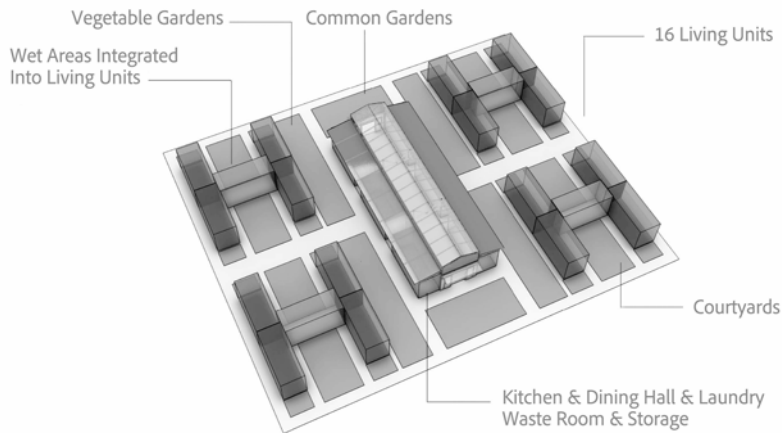
16 containers / 64-80 people

Figure 5: Cluster with H Modules. Render: I-AM.

Basic Needs

The lack of kitchens inside the living units, especially in container cities and tent camps, is indeed an appropriate measure considering the risk of fire. For this safety concern, and also due to the narrowness of interior spaces, we decided not to include kitchens inside the containers. In existing container cities, there is usually a dining hall arrangement to meet the survivors' food needs. These dining halls have a meal distribution system established by specific NGOs, municipalities, and governmental institutions. However, from a psychological perspective, survivors who have been receiving sustained meal support from specific organizations for a long time in such temporary collective living spaces can be alienated from their daily routines, whereas they need a system where they can preserve their own daily lifestyles. This led us to create kitchen islands in the central parts of our container neighborhood master plan. Within these kitchen islands consisting of four containers, we provided cooking solutions and placed tables to fulfill the need for communal gatherings. Moreover, we designed small gardens within these islands where people can grow their own food. We considered it essential to create spaces where individuals can engage in activities that can psychologically benefit the human spirit, such as cultivating the soil (Millican et al., 2018). The central island also houses a laundry room and waste disposal room to cater to some of the essential living needs of the unit's residents (Figure 6).

Figure 6: Growth Program in 3D Render: I-AM.



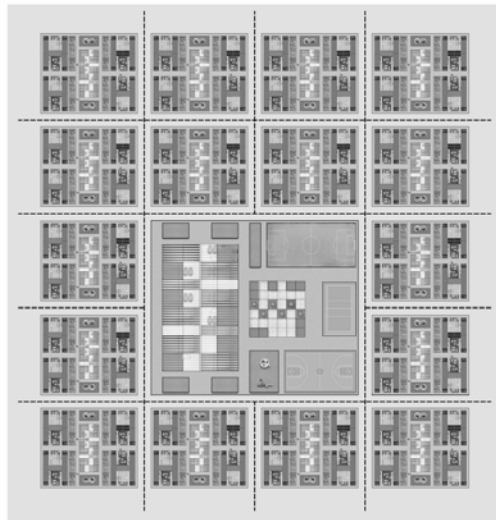
Social & Recreational Needs

The design team undertook the task of crafting social spaces at the neighborhood and town levels, which emerged from the clustering of other clusters and neighborhoods. At the neighborhood scale, these social spaces encompass public facilities (including a supermarket, pharmacy, and infirmary), educational zones (comprising classrooms, technology hubs, playrooms, study centers, and workshops), baby care facilities, as well as distinct recreational and activity areas catering to both men and women. The aim was to incorporate all necessary social amenities within these neighborhoods, catering to anyone seeking to regain a foothold in life and to those aspiring to acquire vocational skills, enabling their reintegration into social life in the future.

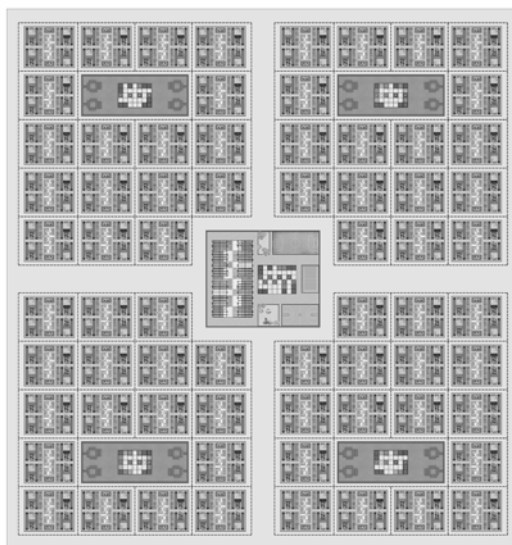
The requirements mentioned above pertain to a cluster accommodating 16 clusters, consisting of 256 containers, and serving 1200 individuals (Figure 7). As the population size grows, the facilities also transform; for instance, the study center can evolve into a school, and the infirmary can develop into a polyclinic. At the town level, an addition to existing social amenities includes the incorporation of a nursery and a primary school (Figure 8). These educational buildings, designed with secure play areas for children, offer specialized spaces tailored to the needs of distinct age groups. These spaces include facilities such as areas for breastfeeding and diaper changing, sensory integration spaces for children aged 1–4, and dedicated educational zones for those aged 6–12. Furthermore, communal workspaces were established to accommodate survivors who must continue their work while rebuild-

ing their lives. The health units on the town scale, designed under the supervision of an interior team experienced in health services, encompass observation rooms, doctor's offices, clinics, and injection rooms, effectively constituting a family health center equipped for minor medical interventions.

Figure 7: Neighborhood Level. Plan: I-AM.



16 clusters
256 containers / 1000-2000 people

Figure 8: Town Level. Plan: I-AM.

4 neighborhoods / 68 clusters
1156 containers / 4500-5000 people

Security

In container cities, security measures encompass diverse parameters, with traffic safety being a pivotal concern. Traffic safety necessitates the provision of transitions between containers that adhere to appropriate standards for both pedestrians and vehicles. The neighborhood should incorporate well-designed pavements and crosswalks, facilitating secure pedestrian mobility. Roads must be engineered to accommodate emergency vehicles like ambulances and fire trucks efficiently. These wide passages can serve as fire safety lanes, particularly crucial for structures prone to fire hazards, simultaneously serving as dividers between zones. This tactical layout also functions as a rapid response mechanism to potential fires within clusters or neighborhoods, preventing them from spreading to adjacent units.

The significance of lighting in communal areas cannot be overstated in terms of safety. Well-designed and adequately illuminated vehicle and pedestrian pathways not only enhance security but also exert a positive psychological impact on residents.

A chief challenge in the development of post-disaster collective living areas is ensuring access to clean water. Establishing a well-planned infrastructure that can provide clean water to the designated areas within each living unit is a crucial step toward meeting the needs of the residents.

Another commonly encountered issue in post-disaster collective living areas is the threat of flooding. To safeguard container units against water accumulation and moisture-related predicaments, they must be situated on elevated and well-insulated foundations, conforming to established standards.

Participatory Design Practices for the Survivors

In 1999, as a result of the devastating earthquakes that occurred in the north of Turkey, a cooperative formed by disaster survivors came together to initiate the “Düzce Umut Evleri” (Düzce Hope Homes) project for permanent housing construction. During this process, the Düzce Umut Atölyesi (Düzce Hope Workshop), in collaboration with Mekanda Adalet Derneği (Center for Spatial Justice) and International Cooperation in Urban Development, prepared the “Kendin Yap Kataloğu” (Do-It-Yourself Catalog), which aimed to create a participatory project and establish a livable neighborhood. The contents of this catalog included instructions for the simple implementation of urban furniture to be used in communal spaces by residents. The information is gathered from the Do-It-Yourself Catalog by Düzce Hope Workshop (Center for Spatial Justice & International Cooperation in Urban Development, 2014).

Kang et al. (2014) states that participatory design enables users to experience a feeling of possession. In our container city project, we utilized some examples from the DIY Catalog to create a sense of ownership by forming a participatory organization and to ensure that disaster survivors feel productive and well.

We took some small initiatives to create a sustainable form of living, for instance by using solar panels for electricity atop the containers, establishing areas such as small fields for the survivors to grow vegetables for themselves.

Furthermore, we conducted research on sample projects, which varied between 6 months to 2 years, concerning the future use of these container cities which would be initially structured as temporary housing units. Istanbul 29 Mayıs University Elmalıkent Male Student Dormitory, which was constructed as a quick response to the urgent accommodation needs of students but in a way that they could be repurposed in the future, can be cited as an important example to this sustainable approach (Figure 9). After disaster survivors’ transition from container cities to permanent settlement units, the units in these areas are envisaged to be transformed for various purposes, such as student dormitories, social activity areas for neighborhoods,

libraries, classrooms for extracurricular courses, and tutoring centers, among others.

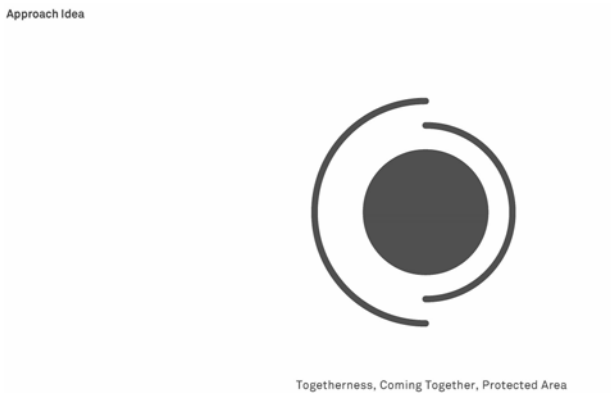
Figure 9: İstanbul 29 Mayıs University Elmalıkent male student dormitory. Photo: Arkiv



Graphic Concept

Within our design practice at I-AM, spatial design is approached with a comprehensive strategy that encompasses not only interior architecture but also takes into consideration brand communication. In this regard, we articulated a deliberate graphic approach for the project at hand (Figure 10).

Figure 10: Graphic Concept. Image: I-AM.



We acquired an interesting insight from the existing literature we reviewed: naming temporary post-earthquake housing areas after the regions that the survivors had previously called home evokes a profound sense of belonging among the residents. Consequently, our nomenclature for the container neighborhoods was thoughtfully crafted in alignment with this insight.

Furthermore, we noted a crucial yet often overlooked aspect in the layout of container cities and tent cities: the naming of streets and container numbering. This form of naming and numbering plays a crucial role in averting the sense of disorientation and in identifying addresses within sprawling container cities composed of similar structures spread across extensive horizontal expanses. Our examination of the literature revealed a noteworthy phenomenon in existing container cities: inhabitants often take it upon themselves to define their living spaces, striving to communicate their individuality through means such as distinctive container painting. In light of these research findings, we embarked on an endeavor to transform this phenomenon into a refined graphic language. To that end, we meticulously developed an iconographic system, designed to delineate each personalized area (Figure 11). Our aspiration was to translate this designed graphic language into a pattern suitable for outdoor application.

Figure 11: Iconography for Different Modules. Image: I-AM.



In addition, recognizing the significance of supporting children during their educational and adaptational processes, we offered workshop proposals for the personalization of container tops. This personalized touch not only fosters individuality but also contributes to the educational environment.

Finally, it is noteworthy that the approach to pattern and color we have cultivated is a manifest not only in the aesthetic dimension but also plays a functional role in guiding and signposting within the community.

Conclusion

In retrospect, the Post-Disaster Container Living Units project stands as a comprehensive master plan, tailored to flexibly meet the diverse needs of different regions tackling crises. While the plan was originally designed as a pragmatic response, we need a deeper exploration of the theoretical underpinnings within the context of 'Design and Crisis.'

Design can not be seen merely as a passive participant in the narrative of crises; it is an active shaper of our response mechanisms. Through design thinking, iterative processes, and a deep understanding of human needs, designers can influence the very nature of how we address and navigate crises. This entails creating solutions that not only address the immediate impact but also foster long-term resilience, sustainability, and adaptability.

The Post-Disaster Container Living Units project, considered as a whole, is designed as a master plan that allows for the adaptation of its various modules to areas of different scales based on regional needs. In the future, the project's open-source nature is also expected to contribute to other post-disaster design projects. Moreover, the emphasis on open-source principles in our project has profound implications for the broader design community. By embracing transparency and collaboration, we aim to contribute to a collective pool of knowledge, fostering an ecosystem where lessons learned from this project can inform and enhance future post-disaster design endeavors.

Setting aside all these endeavors, we anticipate specific areas requiring attention in future projects. A significant concern revolves around ensuring the prolonged sustainability of the Post-Disaster Container Living Units. Although we have suggested that these container units, when they finish their life cycle of serving for post-disaster zones, could be utilized in various contexts, such as student dormitories as mentioned above, the environmental impact and adaptability to evolving crises require careful consideration. Another area that should definitely be addressed is the scalability of the project that raises questions about its applicability to different cultural contexts. As we look towards future crises, it becomes essential to carefully examine cultural nuances that the current design may overlook. The project's adaptability for incorporating a range of cultural practices and preferences requires diligent exploration.

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