

# BUILDING BONDS, BUILDING SAFETY

## A BAMBOO PAVILION FOSTERING COMMUNITIES OF CARE

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Design location: Medellín, Colombia

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## Reflection

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It may sound like an exaggeration, but my work on the Master's thesis at TU Delft has been one of the most formative moments in my life, in which my views on design, architecture, urbanism, knowledge and learning, sustainability in all its aspects, socio-spatial justice, women's rights and many other topics have greatly deepened, developed and changed. Never before have I worked on such a long, complex project that brought together so many of my various interests. I am grateful for the opportunity to participate in the Explore lab graduation studio, where, thanks to the great trust from the tutors and the freedom to explore according to my passions and intuition, to experiment, to reflect on different trials, I was able to find the courage to forge my own path and to believe in its validity and value. In working with my supervisors, Leontine de Wit, Rufus van den Ban and Amy Thomas, I was repeatedly surprised by their openness, interest, and positive approach to my ideas - supportive while still offering me the space to explore independently and be myself. As I look back on the last two years of working on my degree, I am proud of how much I have learned and grateful for the huge amount of support and the enthusiastic, engaged environment I have been able to experience at TU Delft.

### **CHOICE OF THE GRADUATION TOPIC**

Thanks to the RIBA Norman Foster Travelling Scholarship, which I received for a research proposal on women's safety in Latin America just before beginning my Master's studies, I had a clear idea for the direction of my graduation already in the first days at TU Delft. From the wide selection of courses at our Faculty, I managed to choose a path that was related to this topic and supported me in preparations for the research project in many ways. Being part of the Honors Program Master also motivated me to gain necessary knowledge and skills.

I decided to address the topic of women's safety in public spaces because of my own experiences of violence and fear in public spaces, which I soon learned were shared with other women, and because of the terrifying data about gender-based violence. I focused on Latin America – a continent with particularly high rates of violence and gender inequalities. I found out about the UN Women's initiative 'Safe Cities and Safe Public Spaces for Women and Girls' and I was curious about its long-term effects. I wanted to understand if – and how – the disciplines of architecture and urban planning can shape not only objective safety but also the perception of fear and distress or safety and freedom among women. After preliminary research, I was inspired by the scale of women's struggles against violence in this part of the world and I wanted to learn from Latin American women.

## **GIVING VOICE TO MY INTERESTS IN HUMANITIES**

After the first literature review, which focused mainly on traditional approaches to increasing security through "designing out crime", such as CPTED or the "Defensible space", I felt unsatisfied and somewhat disappointed. These theories focused exclusively on crime rates while neglecting fear of violence and perception of danger, and often failed to consider social relations or the complexity of contemporary urban settings. Some of them, like the "broken windows" theory or the design of restricted-access communities, reinforced social exclusion or class-based inequalities.

At that time, several academic opportunities allowed me to look at the problem more broadly and learn from the methods of humanities that had always interested me. In November 2021, I spent two days at the 8th Annual Conference of the Jaap Bakema Study Centre "The Observers Observed: Architectural Uses of Ethnography". This was my first encounter with the term "architectural ethnography", or "architectural anthropology" and it had a huge impact on my approach. I was fascinated by the possibilities of understanding the relationship between humans and space offered by anthropological methods - both the more traditional and the more experimental ones. I borrowed several ethnography textbooks, out of which I particularly remember the book by Martyn Hammersley and Paul Atkinson "Ethnography. Principles in practice", and I read a lot of articles, including "Towards an Architectural Anthropology" by Marie Stender which was one of the most relevant for me. For the Elective courses in the second semester of my Master's, I chose two ethnographic courses: Architectural Ethnography (AR0106) and Get in Touch with the Neighborhood (AR0104). It was a great occasion to use the methods in practice for the first time. During these courses, I overcame my fear and managed to conduct my first interviews, including some in Spanish with members of the Latin American community in Rotterdam. I realized how much I can learn using the methods of architectural anthropology, and I was even more excited to begin my own individual research project.

When I was preparing the first version of the research plan, I came up with and described 18 ideas for research methods, including interviews, surveys, social mapping, transect walks, workshops with maquettes, photography, collages, video screenings, recordings, collective case study analysis, simulated investments, design workshops and more. I also planned to conduct about 100 interviews. Although I was initially disappointed when these plans turned out to be completely unrealistic, now I look at them with a smile and I am proud that during 3 months of field work I managed to conduct as many as 30 in-depth interviews, collect about 100 survey responses and learn so much about the cities of South America, which I visited for the first time, realizing my childhood dream.

At the same time, history began to be another important layer in my project. At the "Architectural history thesis" seminar, led by María Novas Ferradás, I encountered the feminist approach to architecture, urban planning, and their history. With María's guidance, I wrote the paper "Women's struggles against patriarchal violence: Debates on women's safety in Latin American cities during the 1970s and 1980s". This study was extremely important for understanding the context of my research. I realized that Latin America is not only relevant for my study because it is still one of the most violent and unequal regions globally but most importantly because it has such a long history of struggles for women's human rights, freedom, and safety. I was fascinated by the strength of many bottom-up movements and their political influence. Feminist researchers' perspectives on urban safety answered many questions that had not been addressed in the long-established approaches to the design for enhanced security, with which I began my literature review. Expanding my knowledge of the field of feminist urban planning and architecture had a huge impact on building the theoretical basis of my study. Later, during my trip, I managed to meet and interview many renowned representatives of this environment in Latin America, which was an extremely valuable learning experience for me.

## THE RESEARCH TRIP

From August to December 2022, I traveled throughout South America, conducting my research in four cities - Medellín in Colombia, Quito in Ecuador, Santiago in Chile, and Montevideo in Uruguay. I also visited Peru, Argentina, and Brazil. The opportunity to experience for a few months the architecture and the cities outside the cultural area in which I grew up, awakened my fascination with the world and was very enriching. There are 10 times more people living in Santiago de Chile than in Warsaw where I come from. Medellín, Quito and Santiago are all big cities located on a slope of the mountain – a difficult topography with an influence on the organization of the city which I never realized so strongly before. I was also surprised by the scale of social inequality and socio-spatial fragmentation, which changed my perception and sensitivity as an architect. I learned a lot, not only about the challenges that I mention, but I also got to know wonderful examples of the architecture of this continent, for example during architecture tours of Rogelio Salmona's buildings in Bogota or Lina Bo Bardi's in São Paulo.

However, the most important learning opportunity for me was meeting many women, living in the cities that I researched and interviewing them about their lived experiences. From the first moments of my stay in South America, I was struck by how present and important the topic I was delving into was there. I had a chance to talk about it both with residents and experts, from the fields of architecture, urban planning, criminology, anthropology, sociology, psychology, gender studies, political sciences, and law. This was extremely important to me and allowed me to better understand the complex nature of urban safety - an issue that cannot be understood within the boundaries of a single discipline.

Although the approach was interdisciplinary, my background in architecture and urban planning was relevant and influenced the definition of the research topic, the course of the interviews, and the observations. During my trip, I often wondered about the role of architects in improving safety in public spaces. I had moments of doubt when it seemed to me that designers couldn't change anything. However, my conversations with women and my own experiences allowed me to notice that - although architecture certainly does not play the only or the most important role in fighting violence against women - the transformation of public spaces do have an impact on the perception our safety. During the research, there were moments when, unconsciously, I really wanted to find a set of simple rules - ways of 'designing out crime'. When I discovered this need and disappointment in not finding such repeatable, ready to implement solutions, it was helpful to return to feminist literature and remember the perspective of people from outside the world of architecture. I see this as a process of finding some modesty as an architect, realizing the limitations of the discipline, while not running away from responsibility of being part of the change and proposing improvement where it is possible. I believe that with an interdisciplinary approach, a lot can still be done to improve safety in public spaces.

It was also important for me to create a short atlas of examples of public space elements that had a positive impact on the sense of security of my interviewees. These solutions were on different scales - some small and temporary, bottom-up, others large-scale and initiated by the authorities – and were very diverse. Following the analysis of the underlying meaning of these elements, and the information from the interviews and survey, with the guidance of my research mentor, Amy Thomas, I formulated six principles for architecture and planning help increase the sense of safety. The process of defining those categories in my research paper, finding the correct words, and selecting the most important observations, was a great intellectual challenge. In the results of my research, I do not offer specific, easy to implement designs, but I believe that the application of the framework I proposed in various solutions could have a positive impact on gender equality.

## **FROM RESEARCH TO URBAN PLANNING APPROACH**

The first ideas that I had when making the transition from the results of my research to the design, were on an urban planning scale. I was fascinated by several successful large-scale projects in Latin America— mostly by the Manzanas del Cuidado (Urban Blocks of Care) in Bogota, the Metro system and “metroculture” in Medellín, the feminist square of Las Pioneras (The Pioneers) in Montevideo and the UVA - Unidades de Vida Articulada (Units for the Articulation of Life) in Medellín. The latter became especially interesting for me, because the improvement of urban safety was explicitly mentioned as one of its goals. I became really interested in the latter and I came up with an idea to focus my graduation on expanding it with a gender perspective. Within the UVA program, citizens are invited to become involved in the building of cultural, recreational and sports venues at previously inaccessible and insecure open areas in the middle of disadvantaged neighborhoods, near the water tanks. It is a successful social urbanism project, which already has a big influence of greater equality and safety. I made an urban and functional analysis of the already completed UVA's and a selected one of the lots which was still awaiting renovation within the program as my project location. The site had 17,700 square meters, and I initially proposed to design five buildings and surrounding open public space. I wanted to introduce functions addressing the specific needs which are often overlooked, while being crucial for the perception of safety and freedom, like a space where women's collectives could effectively participate, a school of participation, a unit with psychological and gynecological help, and functions related to caregiving – like children daycare or laundry room. The main concept that I wanted to follow was to fit within a greater program belonging to a distributed model of urban interventions. Following the results of my research, with my design I wanted to strengthen the networks of care, propose an inclusive functional program with space for activities attracting people around the clock (including non-commercial ones), and to provide spaces for organization, collective action, sharing and participation of women.

## **MATERIALITY – BAMBOO**

After analyzing the climate, traditional building techniques and locally available materials in Medellín, I decided to select bamboo as the main building material for my project. Various characteristics of bamboo made me consider it a suitable choice. It is a strong but lightweight material, safe and easy to work with in a participatory building process, including women. Because of that it has a transformative potential for empowering women in construction. Designing in a way that allows for community building – often called minga in the Andean region - became one of the important determinants of my project. Bamboo's beneficial effect on the environment, thanks to the large carbon sequestration capacity, renewability, biodegradability, and other features, was another very relevant reason.

Bamboo is available in abundance in Colombia, and historically used to be an important part of the building culture – before it became depreciated by the colonizers and received a social stigma that influences its low popularity as a 'poor man's material' until today. In recent years, bamboo has been rediscovered by local architects in the region. With my project, I would like to contribute to this trend and help change the social prejudice against this precious local material by designing a public building linked to the unique architectural tradition in Colombia, which includes for example the impressive constructions of internationally acclaimed architect Simón Vélez or works by Ruta 4 Taller, which are an important reference for me. The variability and versatility of bamboo are interesting design possibilities that I also wanted to explore, along with impressive mechanical properties, suitable for a seismic zone in which my site is located. Because I have been fascinated with this natural material since a very long time, I decided to enroll on a 10-weeks long “Fundamentals of Building with Bamboo”, organized by Bamboo U, where I studied joinery techniques, treatment

against insects, UV-rays and fire, and I understood principles to protect the material by design and improve its durability.

The connection to materiality from the very beginning of the design process was very important to me. Simultaneously with developing the architectural form of the building and thinking about its program, I started designing critical joints and thinking about the structural solutions. I followed a method which my mentors – Leontine de Wit and Rufus van den Ban – taught me on the first semester of my studies in the MSc1 Interiors, Buildings, Cities. This was particularly important to me because I am usually not confident in my skills in structural design, and I wanted to make sure I had enough time to complete the building technology part of the project reliably. In the end, the design of the details of reversible became of the most satisfying elements in my project. I proposed innovative ideas for a reversible foundation, a demountable column to roof support prefabricated joint, and a sustainable green roof with biobased alternatives to the traditionally used polymer materials. Thanks to this approach I wanted to maximize the sustainability benefits of using bamboo, and further enhance the positive impact of this pavilion on the environment. These concepts require further testing and I hope they will inspire additional research.

Choosing a material that is still little known or standardized and for which I had to try to come up with innovative joints and build a good understanding of the behavior and stability of the designed structure, was a difficult but meaningful challenge for me. Cooperation with a renown structural engineer from Colombia, Esteban Morales, who decided to volunteer his time for the project, was one of the most interesting experiences I had during my studies. The design has greatly changed and improved thanks to his feedback. Through this cooperation, I have learnt a lot about construction and have greatly developed my imagination and thinking on the subject. Once again, it was an important moment of defining how I see my role as an architect. While being challenged by Esteban's remarks and sometimes surprised with his ideas to drastically change the project, I learned to negotiate the most important elements of my design, while being open to new directions. In this process, I managed to define which elements of the design were truly meaningful and key me in this project and stay true to them, while being flexible in changing other things to reach a better structural performance.

## **CHANGE OF SCALE – TOWARDS AND ARCHITECTURAL APPROACH**

A very important turning point of my project was the proposal of my supervisors to try to build a 1:1 prototype of the project in the Green Village – a lab for sustainable innovation at TU Delft – as part of the new Biobased Boulevard initiative. This unique opportunity to build something at full scale made me rethink my architectural and urban proposal and reflect on the essence of what I believe would be meaningful to show. This has led me to significantly change the scale of the design solution I am developing. I decided on a modular bamboo pavilion that could be incorporated into one of the existing UVA projects. The pavilion is thought to be self-built and managed by a local group of women who decide on the final size, shape, and functional program – in line with the participatory character of the UVA program. The activities can happen inside and around the pavilion that can be adjusted through easy alterations to help build community networks through various activities. The walls serve as shelves, and the entire pavilion becomes a piece of furniture. It is inviting and easy to change something, add elements. Women can easily hang or screw additional elements, adding lightweight textiles, ropes, decorations, lighting or fully enclose some parts for privacy, for example with glass panels, additional bamboo pieces, weaved mats, or a Colombian bahareque technique, creating a wattle-and-daub wall. The architecture supports the process of appropriation.

This change in the scale of the project made my project more connected to the Architecture track of my Master's program that I had chosen and to my previous experience. Most importantly, it made me more confident in combining the results of the research with the project. The final version of the project involves the exchange of knowledge, the empowerment of women who can build and manage it themselves and is closely linked to the tradition of feminist architecture. In its form and technological solutions, it also refers to the Colombian architecture and to building techniques known in that country. Combined with the low cost of materials, it makes it a feasible proposal that could really be implemented in the context for which I am designing to enhance women's safety.

### **PROTOTYPE AT THE GREEN VILLAGE – THE POWER OF A COMMUNITY**

Planning this construction of the prototype at the Green Village was an enriching process of learning, changing approaches and mastering new skills. To implement it, I needed to prepare a construction budget, plan its subsequent stages, apply for financing and sponsorship, prepare a bill of materials and necessary tools, and approach the selection of materials and the design of every detail in a much more accurate and realistic way. It was new for me to think about what the process of building every detail would look like and whether I could do it. Because of the limitations of my knowledge and lack of prior building experience, I needed to choose solutions which are easy for me to work with – a constraint which pushed me to design very much in line with one of the goals of my project, to make construction by a group of unexperienced women possible.

It also encouraged me to draw on the knowledge of the different people in my network and invite them to discuss and improve my project. I have built an interdisciplinary and international community around this project, with over 50 experts from 15 cities in 9 countries, including bamboo consultants, gender-based violence experts, urbanists, architects, structural engineers, psychologists, lawyers, artists, and activists, who greatly helped me to bring this project to a level which I could never reach alone. I've invested significant time and effort into the management process, which became a crucial part of this project. I secured the donation of bamboo and a significant discount for the green roof, reached the last stage of discussions with potential sponsors for transport from Colombia, cooperated with a structural engineer who helped me ensure the construction's general stability, and convinced Marcel Bilow, a tutor from TU Delft, to support me together with the Bucky Lab with the assembly, maintenance, and disassembly of the bamboo pavilion. I attended many meetings and online calls, prepared sponsorship offers, and exchanged countless messages. I learned to really appreciate this kind of work and I have found great enjoyment in this stressful but exciting and rewarding process.

One of the key changes which emerged during this cooperative process was the idea to prefabricate the structure in Colombia and ship it to the Netherlands. The fact that I've found a local bamboo producer and an engineering company interested in prefabricating the joints, provided an interesting opportunity for the future of this project, potentially allowing for its greater scalability. I realized that it would be beneficial for the project to prefabricate the joints which are the most complex, time-consuming, and crucial for safety. The rest of the connections are designed as lashing joints to enhance the interactions between women involved in construction. The idea to prefabricate the pavilion in Colombia and build its prototype in the Netherlands posed several challenges – I had to optimize the use of material to fit all elements into one 20ft container, meet both the Colombian and Dutch building codes, and ensure the structure is resistant to the earthquakes in Medellín, and the strong winds, rain, and snow in Delft. I also aimed to reduce the number of joints to further simplify the prefabrication process. This was in line with the idea to create a modular system to adjust to the needs of the local community. If built, the pavilion would become the first permanent bamboo structure in the Netherlands. In fact, to this date, there is no permanent building in Europe using exposed bamboo in its natural form. Because of that, this project is truly innovative and experimental. I hope that this

construction will allow to test if and how this promising biobased material behaves in our climate zone, which potentially can have a significant impact on sustainable development of our built environment and reaching the climate goals.

I hope that the pavilion in Delft will become a place for the exchange of knowledge and interaction on the topics that are very relevant to me. In this way, I hope that my graduation project will have an added academic and societal value, as a place of discussion about the intertwined topics of social justice and environmental sustainability. The open access to information about my design process is important for me, as it allows for the transferability of the project results and further explorations of the topic by researchers, practitioners, and other interested people. In the further future, I really hope to bring this project back to Latin America. The moment of graduation will be a relevant milestone but definitely not the final stage of this project, which became extremely relevant and dear to me.