

## URBAN FLOODING AND FLOODING MANAGEMENT SYSTEM IN HO CHI MINH CITY, VIETNAM

### I. Problem

Urban flooding is the biggest environmental problem that Ho Chi Minh City (HCMC), formerly Saigon, has to face and deal with in the long term. The city has the most vulnerability to flooding compared to others cities in Vietnam. This is the result of a poor flooding management system due to the fact that all the government's investment has gone toward the growth of urbanization and industrialization. Since 1990s, this natural disaster has worsened and affected the city in the aspects of health, environment, economy and traffic. It ruined lives from the household to the city scale.

As a Vietnamese speaker with an interest in studying flooding management systems in general, I have been able to access and study all the data written in the local language. Therefore, I would like to elaborate by giving specific examples of the negative impacts left by the urban flooding in HCMC. These examples are the experiences that I either witnessed or went through in the past. In the scale of a household, the owners have no solutions other than elevating their houses' floors by stacking layers of bricks. However, this is not effective in keeping the water out. Rather, the result is that many houses become out of human scale because the distance from floor to ceiling is only 5 to 6 ft. Zooming out to the impacts left by urban flooding on the scale of the city, many newly built apartment complexes have gone out of business because they are located in the heart of the flooding area. Consequently, people give up on making investment in housing units. Moreover, the urban flooding leaves the worst impact on the city's traffic. In the flooding season, it is typical that people have to spend hours on distances that would otherwise take only 20-30 minutes to travel, because everyone wants to avoid the deadly flooding in the city. Consequently, this puts almost all the activities of the city in crisis.

### II. Research Questions

In such circumstances, the Vietnamese government has begun to think about solutions in recent years. There have been many solutions proposed by engineers and architects around the nation. There are two solutions that the government is closely paying attention to. The first is **centrifugal pumping machines**, run by electricity or diesel. Theoretically, each machine has the ability to drain 96,000 cubic meters of water per hour. It is also expected to separate waste from water, helping to make the water usable for planting or firefighting missions. The second is **anti-flood reservoirs**. This system features a series of lakes constructed with layers of cross-wave modules, which function as filters with a large space that helps drain flooding

water, and save it for agricultural activities.

The two systems have been helpful in recent time. However, according to experts, these solutions are temporary and they are not able to make a significant difference, compared to the massiveness of the urban floodings that HCMC has to face every year. Even though long-term solutions have been considered for years, none of them have been implemented. Considering the existing urban flooding and the reality that the city has not had any long-term solutions, I have three questions that I believe would be worth a trip to Vietnam to investigate:

- *From the design standpoint, what would be the most effective long-term solution for the urban flooding problem in HCMC? Would it make a difference to systemize the installation of the two machines described above, in the scale of the city?*
- *What is the primary challenge that prevents the realization of a long-term solution for the infamous urban flooding problem in HCMC?*
- *There is always a political factor in the influences of an architectural project. In the case of urban flooding in HCMC, what role does Vietnamese government play in the design process of the flooding management system, and what influence does the government have in the process of bringing the ideas to life?*



One of negative impacts caused by urban flooding in HCMC - Photo by Nguoiladong

### III. Methods and Schedule

If I were to be in Vietnam for the research, I would divide my 16-day trip into three periods.

Period 1: (May 18 - 23, 2018) CALCULATE - With the connections I have from one of my former classmates who is currently working as an engineer in HCMC, I would be able to access the information that helps me calculate the amount of water practically drained by a centrifugal pumping machine or an anti-flood reservoir. From the collected data, I will be able to calculate the total amount of water drained in a system of multiple machines developed throughout the city. This will also help me answer the first question in my proposal, whether a system of machines and reservoirs can be a possible long-term solution for HCMC to cope with the urban flooding issue every year.

Period 2: (May 24 - 28, 2018) ANALYZE - Prior to this proposal, I have done some initial researches about the city planning strategies of HCMC and how the city has evolved since 1975. Based on the collected data from these initial researches, the most important thing I took away is that the urbanization of HCMC lacks collaboration between areas. This causes a difficulty when it comes to constructing a comprehensive network with the scale of the city for flooding management systems. Therefore, I would collect the footprint of the houses and apartment complexes in 24 districts of the city. This will help me systemize the locations of these housing projects. From the collected footprint, I will be able to analyze the available areas that are suitable for specifically building systems of centrifugal pumping machines or anti-flood reservoirs.



The installation of a centrifugal pumping machine - Photo by Thanhnien

Period 3: (May 29 - June 3, 2018) PARTICIPATE - Currently, machines and reservoirs are still installed at various locations in HCMC, despite the missing of a comprehensive system. Moreover, I have a connection with the engineering company that focuses on water controlling projects (where my former classmate is working). Therefore, I will communicate with them so that I can participate in one of their projects. This way I will have an opportunity to learn from the design to the installation process, especially how a project is submitted and reviewed. As a result, I will be able to holistically understand the role of government in architectural projects, particularly in the management of urban flooding in HCMC.

#### IV. Significance

In HCMC, urban flooding is the biggest challenge that takes a collective effort from designers of different fields to help overcome. If I have a chance to do my research in the city, I will be able to make a contribution to the development process of the city. Specifically, I want to publish articles about my research with the information written in both English and Vietnamese.

Currently, there is an architecture firm in HCMC named Alinco, whose primary focus is urban housing projects. Their projects concern specifically urban flooding in the city. Moreover, they are interested in offering me an internship later in the summer. Therefore, the research would be a good step to help me prepare for the job.

Most importantly, I believe that the experience that I have in the city will give me a practical view of the knowledge that I learned in the past 4 years at the School of Architecture. The experience would also benefit me in the sense that it shows me how architecture works in a country with very different political, social, and environmental contexts. What I learn from the trip will ultimately strengthen me as a designer.

#### V. Budget

For travel and research in HCMC from May 18 to June 3, 2018

Airfare:	\$1100
Food: \$20 x 17 days =	\$340
Hostel: \$30 x 17 days =	\$510
Land travel (car rental): \$100 x 17 days =	\$1700
<b>Total Anticipated Expense:</b>	<b>\$3650</b>
<b>Personal Contribution:</b>	<b>\$600</b>
<b>Amount Requested:</b>	<b>\$3050</b>

#### VI. References

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