



Design Odyssey

Social Project Proposal

Project Theme:

Sustainable Architecture

Project Title:

MESSA

(Mobile Emergency Sustainable Shelter All-in-one)

Project Members (with matriculation number):

Hendriko Teguh (1002392), Chen Mei Qing Natalie (1002525),
Cheska Daclag Nodado (1002253), Ho Zhi Yuan (1002404)

Project Leader:

Hendriko Teguh (1002392),

Initial Project Brief

How might we provide efficacious aid for disaster victims through a humanitarian effort at the time they need the most?

Website: <http://MESSA.strikingly.com>

Project Description

Background

According to the Statistics of the Official blog of Concordia University Master of Environment Studies (Concordia, Climate Change, 2014), there has been an exponential increase in the rate of devastating natural disasters in the world due to climate change over the past few decades. Between 1970 and 2014, over 2 million people have lost their lives due to natural disasters in Asia and the Pacific, which make up 56.6% of the fatalities globally; despite the relatively infrequent occurrences of earthquakes and tsunamis, they were the main cause of deaths recorded (ESCAP, 2015). Asia and the Pacific have been labeled the most disaster prone regions in the world, which includes the Southeast Asian countries - Brunei, Myanmar, Cambodia, East Timor, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam.

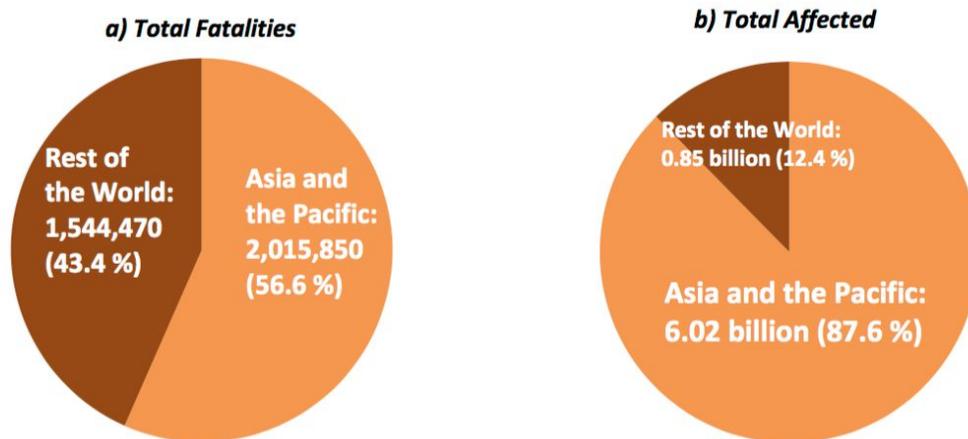


Figure 1. Total fatalities and affected from natural disasters (1970 - 2014)

Figure 1 shows the vulnerability of the Asia and Pacific regions with regard to natural disasters, where the total fatalities and total affected in the Asia and Pacific region make up 56.6% and 87.6% respectively. Apart from damaging countries geographically, natural disasters have also impacted economies negatively. This acts as inevitable obstacles in the continuous development of not only less developed countries (LDCs), but more specifically disaster-prone areas.

As such, with the increasing rates of natural disaster occurrences, it is necessary to provide a stable platform and medium to disaster-prone areas in times of need, so as to reduce and hopefully minimise the damage caused by natural disasters.

Initial Target Community

After much research, our team decided to focus on supporting the natural disaster victims in **Southeast Asia (SEA)**. SEA has been named as one of “the most natural disaster prone area” (UN, 2014), supported by the statistics provided by Konrad-Adenauer-Stiftung (KAS). 4 out of 9 countries listed in the Figure 2 are located in the SEA region. With only 4.5 million km² area, SEA is ranked 3rd for the most natural disaster victims per square meter compared to other Asian regions after East Asia and South Asia (Annex B). Moreover, our personal experiences living in SEA countries gives us more motivation to help out our fellow SEA-mates, where around 157,000 fatalities are recorded between 2004-2013 (Natural Disasters In Asia. 2013).

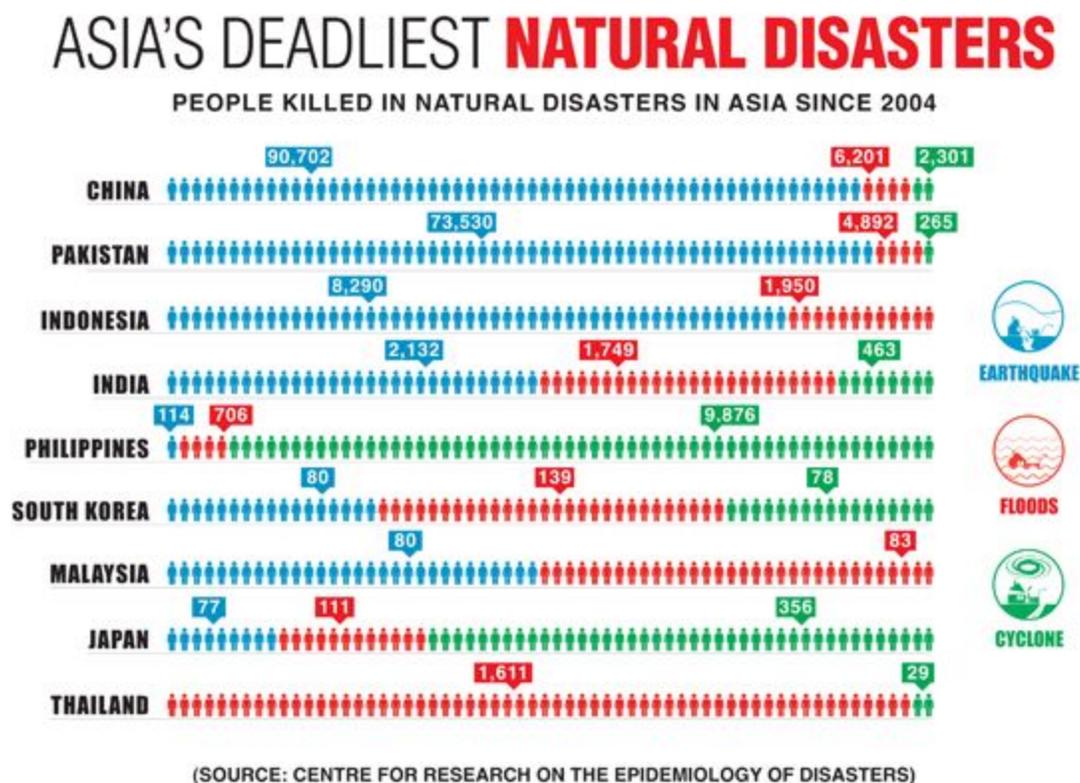


Figure 2: The death tolls of Natural Disasters in Asia (<http://ejap.org/>)

Through internet research, we found out that many of these victims received neither adequate nor effective aid, mainly due to the coordination of the disaster efforts, while the death tolls are often post-disaster death, and not direct deaths (phys.org, 2016). Most of these deaths were due to the lack of preparedness of these victims when natural disaster struck (The Watchers, 2016). Hence, we believe that they are in need of a disaster ready pack that is deployable anytime and anywhere, so as to increase the survival rate of the natural disaster victims.

That being said, MESSA believes that we are able to develop a shelter that is available for people long before they become a victim of natural disasters. MESSA will also aim to provide complimentary post-disaster service as part of the humanitarian effort to further increase the survivability of victims, a complete and all-rounded product-service social enterprise.

Statement of Intent

One of our team members experienced one of the most devastating tropical cyclone in disaster prone country in the SEA region - Philippines. Disasters destroy not just buildings but also people's livelihood and aside from killing thousands of people, it leaves millions of people homeless. People have to seek shelter in schools, churches and other evacuation shelters. It is observed that in the evacuation centers, cramped conditions and limited water and sanitation facilities pose as risks of worsening health conditions of survivors, as Phys.org reports that around 59% of the total natural disaster related deaths are due to improper handling of victims. The existence of many other disasters around SEA and being citizens of SEA serves as motivation to contribute back when we have a chance to.

Besides, the statistics published by Guardian, states that "More than five times as much is spent on disaster response as on disaster risk reduction" which only pushes us further in creating this noble social effort for the victims when they need us the most, minimising budget wastage, yet increasing the world welfare overall. (Jones, S. 2016)

Even with existing relief efforts put in place when natural disasters occur, the number of fatalities and affected people account to large numbers due to inadequate relief efforts. Thus, the increase in natural disaster occurrences in the next few years will heighten the threat to the safety of populations in disaster-prone areas. It is therefore of utmost importance to ensure that people living in these areas are well-equipped to survive and accessible to aid in the event of a natural disaster. To create a more insightful design, we explored existing solutions and reviewed current relief efforts, essentially combining the pros of existing efforts and further improving it.

The common issues in most of the current designs for disaster relief houses are that they are bulky, not eco-friendly, difficult to assemble and not versatile (only cater for certain types of natural disasters). Our team thus aims to resolve all these issues and ensure that users will be able to set up their own shelter efficiently and effectively.

These are a few outstanding solutions currently in the global scene:

reCover



Positive:

- Flexibility ✓
- Expandability ✓✓
- Portability ✓
- Space efficient ✓✓
- Fast Deployment ✓✓✓
(no-assembly)
- Cheap

Negative:

- Featureless
- Bulky supporting components (eg. Bed)
- No Power Generator

Sanctuary Shelter



Positive:

- Flexibility ✓
- Portability ✓✓✓
- Space efficient ✓
- Fast Deployment ✓✓✓
(no-assembly)
- Personal
- Full of Supply
- Affordable

Negative:

- Non-sustainable
- Weak Structure
- Many Breakable Points
- Non Expandable
- Limited Space

Concrete Canvas



Positive:

- Strong
- Sustainable
- Cheap
- Expandable
- Relatively Quick Assembly

Negative:

- One-time expandable
- Difficult to remove
- Bulky
- Lacking of ventilation

HumaniHut



Positive:

- Compact
- Easy to assemble
- All-in-one
- Portable
- Community living

Negative:

- Many wear-and-tear weak joints
- Takes a lot of space
- Need of Level Terrain

Looking at the above existing ideas and solutions, there are many points to improve, and a product-centric solution would not be able to cater the needs of people directly, hence we have decided to follow an audience-centric design process.

Product Intent

Our team has brainstormed some pointers that we hope to include in our design of disaster relief houses. Part of our idea is to make a compact shelter, a product where users can fit into their backpacks and carry it around. Another part of our idea is to design an expandable shelter that can connect with other shelters to form a group. This is a brief outline of our idea and we will develop the details of our design as the project progresses in the next few months.

Service Intent

This development of the product will be supported by a service such as, “Adopt a Shelter” which enables people to help victims directly, by donating some money for the production and funding of the Shelter, and providing a basecamp for further survivability of the disaster victims.

Summer Discovery Plan

By July: We will reach out to various disaster relief organisations in Singapore to learn more about their operations and how we can incorporate the shelter into their efforts. We will collate information on the problems with current shelters and the immediate needs of the people who are affected by disasters and use this information in our design.

We will reach out to firms with existing shelters to learn about the structure, function, materials used, and general benefits and problems of their shelters. This gives us a better idea of which elements to use or dismiss, and allows us to work on issues that have surfaced. With a clear sense of direction, we can progress more smoothly with our conception.

By August: We will reach out to manufacturers whose products can be incorporated in our shelter. Currently, there are innovative technologies which we find applicable to our shelter. After acquiring knowledge of these technologies, we hope to incorporate them in our product.

By September: We are ready for the next level of the design process, which is the review, prototyping, and testing.

We hope to hold regular sessions with these groups to better understand their thoughts and processes, and to establish strong relationships. As our shelter is conceptualised on a needs-oriented foundation, we will require continuous feedback in order to have a well-guided iteration. Links to the intended partner organisations are listed at the end of the document, Annex B.

Member roles

Hendriko Teguh will be leading the project to achieve its goal, and create a discussion environment that is great for collaboration and product design. He will be contacting the disaster relief effort in Indonesia and getting input of the real needs of a disaster victim, he will also be helping out on the design of the product, and the formulation of technology used as well as the overarching service.

Zhi Yuan will be primarily researching on the current design of disaster relief shelter around the world and communicate with various organisation to share their experience in humanitarian effort in the past. He also will be contacting the organisations and victims of the past Malaysian post-monsoon severe flooding, to know better about the needs of the victims and feedback of the humanitarian relief effort of such occurrences.

Cheska will be researching on the most efficient and effective way of providing water and sanitation supplies for survivors to ensure that health conditions of survivors are well maintained. She will also identify the main environmental, economic, technical, and sociocultural factors to improve the provision and performance of disaster relief shelters with the help of feedbacks accumulated from victims as well as from voluntary workers.

Natalie will be focusing on the research of the background of natural disasters with respect to our target audience - SEA countries, and how the future of the world (climate change) may affect residents living in these countries, thus having the need to develop a humanitarian effort in order to minimise the damage suffered by those in disaster-prone regions. She will also research and develop a possible service plan as part of the humanitarian effort, and suggest ways in which the rest of the world may connect and in fact, contribute to this humanitarian effort through various methods.

In a Nutshell

All of us will be involved in designing our disaster relief shelter so that everyone can contribute their ideas and comment on each other's opinions (integrated design process). Throughout the course of the summer discovery plan, our team will reach out to the natural disaster victims in SEA, including Malaysia, Indonesia, and the Philippines, and also to the Singapore side of humanitarian relief effort which have been assisting in disaster relief efforts around the world.

Mentorship

- 1) We need guidance on sustainable design (architecture and product design) to gain insights into making a functional, sustainable, and visually appealing shelter, that resolves the problems of existing shelters. As we aim for the shelter to be mass-produced and distributed to people in disaster-prone areas, we hope to utilise sustainable building materials and construction practices so as to reduce detrimental environmental effects.
- 2) We need opinions from people who are directly involved in disaster relief as they will have a better perception of the needs of the people and can better evaluate the feasibility and usefulness of the shelter. This is necessary as we want our shelter to serve people who have been displaced from their homes unwillingly.
- 3) We need guidance on the technologies incorporated in our shelter such as solar panel system, GPS, and water treatment. Their knowledge in these technologies would expose us to the variety and methods that are currently present which allows us to utilise the most efficient and suitable model in our shelter.
- 4) We need advice from material scientists to determine which material is most suitable for making our shelter. We hope to learn about the characteristics, cost and eco-friendliness of the materials we are working with so as to determine the best combination for our shelter.

Potential Sponsor Organisation & Sponsor Contact

ARUP has been involved in various projects in the past in building houses as part of post-disaster reconstruction. They mainly focus on rebuilding houses in less-developed cities like Pakistan, Haiti, Sudan etc. Their approach is very similar to our team's goal in terms of disaster relief efforts. As such, we can communicate with them in designing disaster relief shelter especially discovering the idea of modular and portable design.

Red Cross (Singapore) is an independent humanitarian organisation which provide aid and support for people in need. They are involved in various overseas humanitarian projects by providing basic necessities (food, water, shelter). Also, they help to rebuild communities after the initial stage of post-disaster relief. As such, we can discuss with them in designing a portable disaster relief shelter as an immediate and temporary shelter during reconstruction phase.

World Vision Singapore is a Christian relief effort organisation that aims to respond with relief efforts within 72 hours of a disaster, fully equipped with pre stockpiled supply, followed up by rehabilitation plans of the affected area. This highly aligns with the aim of MESSA, to provide shelter as fast as possible with efficacious aid, as well as to provide continuous support for the victims until they are ready, just as the word "Messa" implies.

References

Climate Change Feed (2014). Retrieved July 02 2016, from Official Blog of the Concordia University Master of Environment Students, <https://mastereia.wordpress.com>

Overview Of Natural Disasters And Their Impacts In Asia And The Pacific, 1970 - 2014. (2015, March) e-book. 2 July 2016. Retrieved from http://www.unescap.org/sites/default/files/Technical%20paper-Overview%20of%20natural%20hazards%20and%20their%20impacts_final.pdf

Asia-Pacific report: World's most disaster prone region experiences three-fold rise in deaths. (2014, December 18). Retrieved July 01, 2016, from <http://www.un.org/apps/news/story.asp?NewsID=49642#.V3ansrh96hd>

Natural Disasters In Asia. (2013). Retrieved July 01, 2016, from <http://ejap.org/environmental-issues-in-asia/natural-disasters-asia.html>

The world is unprepared for impending natural disasters. (2016, April 26). Retrieved July 01, 2016, from <http://thewatchers.adorraeli.com/2016/04/26/the-world-is-unprepared-for-impending-natural-disasters/>

Jones, S. (2016, April 24). World heading for catastrophe over natural disasters, risk expert warns. Retrieved July 02, 2016, from <https://www.theguardian.com/global-development/2016/apr/24/world-heading-for-catastrophe-over-natural-disasters-risk-expert-warns>

Natural disasters since 1900-over 8 million deaths and 7 trillion US dollars damage. (2016, April 18). Retrieved July 03, 2016, from <http://phys.org/news/2016-04-natural-disasters-1900over-million-deaths.html>

About MESSA

The Origin of The Name

MESSA di voca is a singing technique from Italy. The singer will start gentle and gradually go higher and higher and ends on a gentle lower note. This represents the effort of MESSA where we want to approach disaster victims with human gentle touches, and provide them with everything essential required for one to survive (the high pitch), and at the end, when situation supports, we will start to move out gently to ensure their continuity of life and not just . (ends with a gentle note)



Project Logo Meaning

Boxes symbolise the strength of our future product as well as the sense of safety for the users of our product-service effort.

The two boxes overlapping symbolises the design thinking cap that we are using, where we overlap the needs of people and the technology.

One box that is filled with faint green colour symbolises the vulnerability of our victims, while the darker shade of green is our strength, when the two are overlapped creating a darker shade of green, which symbolises that empowerment does not come only from one side of the design thinking, but from both sides. This suggests that with our strength together with the feedbacks, and the understanding of the needs of people, MESSA will be able to empower the victims also ourselves.

The colour green also symbolises the sustainability and social approach that we use in the development of the idea.

Annex B

Calculation

Deaths per million square km:

- East asia→ 8337.083333333333/deaths/mill km2
- SEA→ 5053 deaths/ million km2
- South Asia → 16280 deaths/ million km2

Excluding Tsunami death toll

Links to Organisations

Disaster Relief Organisations:

<http://www.mercyrelief.org/what/international-programmes/>

<http://www.worldvision.org.sg/about-us/our-vision-mission/>

<http://www.rsis.edu.sg/research/nts-centre/research-programmes/humanitarian-assistance/>

<https://www.redcross.sg/our-services/international-services.html>

http://www.mindef.gov.sg/imindef/key_topics/overseas_operations.html

Existing Shelter firms

<http://www.sprung.com/structures/government-buildings/disaster-recovery>

<http://inhabitat.com/8-innovative-emergency-shelter-designs-for-when-disaster-hits/>

<http://www.gizmag.com/disaster-emergency-relief-shelter-best/40699/>

<https://www.shelterbox.org/>

<http://weburbanist.com/2008/11/12/lifesaving-temporary-emergency-shelters-buildings/>

Firm(s) involved in humanitarian projects:

http://www.arup.com/homepage_archive/engineers-and-disaster-relief

Innovative technology:

UK Bouncy Castle:

<http://www.beetee.co.uk/>

<https://www.ajluk.com/>

Aeroplane Slide:

<http://utcaerospacesystems.com/cap/products/Pages/inflatable-evacuation-systems.aspx>

<http://www.whbrennan.com/Division/Flight-Safety> (repairs)