Foldable Disaster Shelter – An EPS@ISEP 2020 Project

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ABSTRACT

This paper reports the research and development of a foldable disaster shelter for people affected by natural disasters. The main objective of the project was to design, simulate and test an ethically and sustainability driven safe and foldable shelter. The SafeBIS Shelters proposal aims to create proper space for people in distress, while keeping families together, and protecting users. This goal was pursued by designing a modular honeycomb-like shelter, that offers a living space for three people together, and a smart packaging solution, where the floor folds to serve as a packaging box for the entire shelter. Several shelter units can be connected through a second door to create family islands for larger families. The shelter includes a folding structure mechanism and floor to enable easy assemblage, storage, transportation and, thus, increase lifespan. The selected materials have a low environmental impact. The solution comes with a Web application to help rescue organisations to follow the scheduled maintenance plan and keep track of the deployed units. This paper describes the state of the art research, the ethics, sustainability and marketing analyses, the design and simulation of SafeBIS as well as the obtained results.

CCS CONCEPTS

• **Applied computing** → **Engineering**; **Education**; **Collaborative learning**; • **Social and professional topics** → *Cultural characteristics.*

KEYWORDS

Collaborative learning, Engineering Education, European Project Semester, Sustainability

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1 INTRODUCTION

The European Project Semester (EPS) trains students to work together, providing tools and competencies to realise ideas in a real-world environment in close cooperation with local industries and organisations. The purpose of this semester is to develop teamwork, project management, design, to improve communication skills between different cultures and characters, to motivate students to work and cooperate in teams of four to six students. EPS was designed and create by Arvid Andersen in 1995 to prepare engineering undergraduates for their future role as global actors of change.

In the spring of 2020, a team composed by Eduardo Pereira, an automotive mechanical engineering student from Portugal, Andreea Popescu, an industrial engineering student from Romania, Gabriel Givanovitch, a structural materials engineering student from France, Lore Pauwels, a product engineering student from Belgium, Jelte Bakker, a physical engineering student from The Netherlands and Vladimir Dukoski, a digital business informatics engineering student from Macedonia, decided together to develop "SafeBIS". A brand that develops sustainable foldable disaster shelters for people who suffer from a natural disaster and were left homeless. Natural disasters are extreme, sudden catastrophes that are caused by natural processes by the earth. Different types of natural disasters include floods, hurricanes, tornadoes, earthquakes and tsunamis. Many consequences occur as a result of natural disasters, which include death, public health issues, economic - and infrastructural damage. Equatorial regions are the most affected areas by natural disasters, unfortunately equatorial areas are accompanied by countries with low-incomes [3]. These low-income countries do not have enough money to rebuild after a natural disaster and, therefore, rely on foreign aid. Globally, over the past decade, natural disasters accounted for an average of 0.1 % of total deaths. This was, however, highly variable to high-impact events and ranged from 0.01 % to 0.4 % of total deaths. At the same time, overall economic losses caused by natural disasters are increasing worldwide [7]. In 2019, the estimated economic loss of natural disasters worldwide was 73 billion U.S. dollars, while the estimated insured loss amounted to 20 billion U.S. dollars, according to Aon PLC [5]. Considering all these aspects, through this project, we want to meet the needs of people who have suffered these traumas, by developing a sustainable concept to design a shelter that achieves all the necessities and to create a conducive environment for them to live in safety. This paper aims to provide a better understanding of the entire process the team has gone through. With this in mind, the paper is organised in 8 sections, each targeting the construction of the shelter. The first two sections focus on the analysis of past and present problems that occur around the world, but also on the analysis of the market for the study of already existing concepts. The third section establishes business and planning framework followed by the marketing strategy approach. The fifth and sixth sections analyse the eco-efficiency measures for sustainability and the ethical and sustainability considerations which will be later applied later on the product development described in section seven. Taking into account all the obtained results and the applied tests, the last section provides the overall conclusions.

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2 RELATED SOLUTIONS

When considering the development of a disaster shelter, a clear overview of existing types of shelters was performed: recreational shelters, animal shelters and emergency shelters were analyzed to create a broad perspective.

The recreational shelter analysis considered a rooftop tent, an inflatable shelter, an instant tent and an origami shelter, four types of shelters all bearing an interesting characteristic that may be useful to apply to our proposal. The comparison criteria were transportability, shape/structure, design, maintenance, materials, dimensions and price. The rooftop shelter brings an interesting way to unfold the tent and the possibility to place it on every desired place. Being light and easy to repair are advantages of the inflatable shelter. However being forced to stand on flat ground is a downside. The regular tent is light, easy way to repair and quick to set up. The origami shelter is light as well, besides this, it provides privacy, comfort and protection [6]. As the origami shelter is also resistant for heavy weather conditions, this type of shelter reunites the best characteristics to be a disaster shelter. An example of the origami shelter is illustrated in Figure 1.

Figure 1: Origami Shelter [10]

As for to the animal shelter analysis, a comparison between a makeshift shelter, animal shelter and animal house was made. Transportability, design, period of use, materials, dimensions and price were the parameters during the comparison. The makeshift shelter is easy to fold and transport, however it is not resistant to bad weather conditions [1]. The animal shelter is favourable because of its compact space division and the use of materials that absorb noise [8]. Animal houses bring a unique folding technique and choice of materials to ensure the shelters are weather resistant.

The United Nations Commissioner on Refugees (UNHCR) devised a set of guidelines to be followed when developing an emergency shelter. Basic requirements such as protection, space to live and store belongings, privacy, emotional security, comfort and sleeping equipment (blankets, mats…) must be provided. UNHCR prefers simplest structures and least labour-intensive building methods. Besides this the shelters must be easy to supply to the affected area. Depending on the region, cold or warm climate considerations have to be made. A minimum living space of $3.5\,m^2$ per person is determined by this as the SafeBIS team decided to build shelters for a warm climate, namely the equatorial climate. According to the fact that the shelters will be used for 2 weeks, get stored and reused, longer-term standards such as provisions for repair materials and storage possibilities were approached as well [9].

3 ETHICS

Regarding the SafeBIS product, a foldable shelter, the team wants it to be compatible with the words "ethics" and "deontology", thus ensuring a good reputation for the company and a real success for the product. The company's values, strategies and actions influence the perception of the product and the purpose to what is aspired, so operating and applying human laws and requirements is of paramount importance. Concerning Engineering Ethics and the field of applicability, the development and creation of the product is in accordance with safety, health, and welfare of the public. Embracing trustworthiness, dependability and punctuality is a priority. From the early beginning of the design until the distribution of SafeBIS shelters, adopting a sustainable strategy and being in accordance with the laws of ethics is essential to ensure the connection between user and product. All aspects, engineering, marketing, sales, environmental must be taken into account in each step of this process. The main aspect of environmental ethics is finding the balance between social, economic, and environmental aspects and trying to be more sustainable in all actions. Considering the use of recyclable materials, SafeBIS pursues to create a product with a low impact on the environment, which integrates perfectly in this picture of environmental protection and the well-being of people affected by disasters. The SafeBIS Shelter is a product created in accordance with all these aspects, promising high user compatibility, ease of use, compliance with all directives and laws, and ensuring the health and safety of families.

4 MARKETING

While working on the market/economic analysis, the team has brooded out their vision and created a better perspective of the market environment surrounding SafeBIS and emergency shelters. The SafeBIS brand was defined and strategies were pointed out to ensure to enter the market strong. During the demographic analysis primary and secondary targets were listed. The primary is consistent of companies, business and non-profit organizations that deal with fund raising and donations. Paid advertisements form the secondary focus, by using this individuals will be reached. The way that SafeBIS will establish their presence in the market is by using the social media. By actively posting materials and using paid advertising bigger audience will be reached. A website was established to inform interested people and a remarkable logo was designed. The logo is a reflection of the brand, the colour orange stands for creating a warm atmosphere, the black for the strength. The honeycomb symbol refers to the shape of the shelters. The logo is shown in Figure 2.

Using these methods SafeBIS will have their digital face and presence of who we are and what we do. Last of all, being true, honest and open about our intentions is important. The being-real factor is usually forgotten but those who do, haven't done well in today's business. Being transparent and sharing what we do, how we do it and why, is essential. Using the established social medias the team will share and connect more easily with our audience.

Figure 2: Logo SafeBIS

Knowing who our target audience is, what they want (being true), how to reach them and where, makes it possible for SafeBIS to come out strong on the market establishing SafeBIS as a known brand and a trusted company.

5 SUSTAINABILITY

The subject sustainability is approached during the development of the SafeBIS shelters as it is more and more important to make products sustainable and to keep the environment unharmed.

The concept of sustainability can be reached by looking at the environment, the social aspect, and the economical aspect. To achieve the highest level of sustainability each of the three pillars should be taken into account. Considering this approach, SafeBIS will focus on materials and the adaptation to the environment (location). The pillars are illustrated in Figure 3.

Figure 3: Sustainability Pillars [2]

The materials need to be able to survive harsh weather circumstances, as this ensures a long life-span for the shelters, while being good for the environment. The team pursues this by using nature-based and 100 percent recyclable materials which are all easily to separate from each other after they were assembled together. SafeBIS focused on creating the shelters with as less different materials as possible; cotton, aluminium and cork are used as the main materials. They were chosen as they meet above requirements and are resistant to drought, rain, and the sun.

For the location, it is important that none of the places that are used or passed during the production of the shelters should endanger the environment in any way. The assembly process, which takes place in the equatorial regions, should be as easy as possible. The disaster shelter is built in a way that it is only possible to create a tent shape in one possible way. SafeBIS strives to develop an easy setup system that won't damage the placement area. The entire shelter is built in a way to keep the pollution as low as possible, but most important to keep the victims safe.

The manufacturing process takes place in Romania as this country offers a large amount of reliable producers for the needed components/materials, this limits the emissions as no long transport will be needed. The components are limited to as few components as possible and the packaging is developed compact to ensure a minimal transport to the disaster area. This packaging way allows the team to transfer 18 shelters in one truck. Figure 4 shows the arrangement of the shelters in a truck.

Figure 4: Transport Efficiency

Concerning to the employees that help in the manufacturing process, the team focuses on keeping the employees safe by implementing good work environments and there will be invested in the education of our employees so they are qualified and won't spill the materials.

The disaster shelter can be described by two of the sustainable development goals. Good health and well being and Sustainable cities and communities.

6 PROPOSED SOLUTION

6.1 Concept

The SafeBIS team developed a shelter for people who live in an equatorial area and were affected by a natural disaster. Every shelter is designed to offer four people a sleeping/living place. The shelters have a hexagonal shape in order to create a big community by connecting several shelters together. The community allows big families to live together. The shelter is water resistant and is provided with a good ventilation in order to offer the users a pleasant, temporary living place. The average period of use will be two until tree weeks. Regarding to this, the team designed a comfortable shelter which provides safety for the user and which is easy to (dis)assemble as a folding mechanism is integrated. The folding mechanism ensures an easy and compact transport.

6.2 Requirements

The team decided to define requirements in order to measure the success of the process. Functionalities were developed based on project requirements and tests were used to check whether or not these requirements have been met.

The project has the following requirements:

- A scale model of the product

- Usage of low-cost hardware solutions (Not exceed the budget of € 100 for the construction of prototype)
- Usage of the open source software
- Adaptation of the International System of Units (NIST International Guide for the use of the International System of Units)
- Comply with EU Directives
- UNHCR guidelines
- Humanitarian Shelter and Settlements Guidelines

6.3 Specifications

In order to pursue the requirements of the UNHCR, a living surface of at least 14.0 m^2 had to be achieved to shelter four people as every person requires a minimum space of 3.50 m^2. According to this, following dimensions were defined. The hexagonal outer structure in what 'the living cocoon' is placed, has a surface of 16.3 m^2, the sides of the hexagon have a length is 2.56 m, the structure has a maximum width of 5.11 m and a maximum height of 2.85 m including the 0.30 m height legs on which it is placed. The living cocoon has a surface of 14.3 m^2, hexagonal sides of 2.35 m, a maximum width of 4.70 m and a height of 2.30 m. When the shelter is transformed into the storage container, it has a length of 4.39 m, a width of 1.22 m and a height of 0.73 m. The shelter can stand a maximum load of 780 kg inside and is resistant to winds up to 75 km/h. The shelter is manufactured from aluminium, cotton and cork. The folding structure is build of beams of 50 mm × 50 mm and the cocoon which is formed by walls and the roof is made of cotton. A cork roll is used to put inside the cocoon to serve as carpet, this role brings a pleasant feeling and homey atmosphere. The floor is made of an aluminium composite panel. The structure weighs 75 kg, the fabric 30 kg, the floor 72 kg and the cork roll has a weight of 10 kg. The total weight of the shelter is 187 kg. In Figure 5 a full view of the shelter is shown.

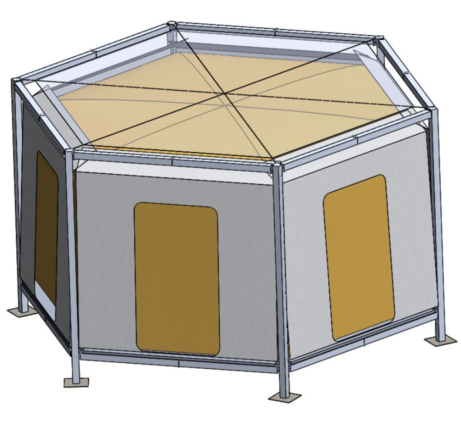

Figure 5: Shelter

6.4 Design

6.4.1 *Structure*.

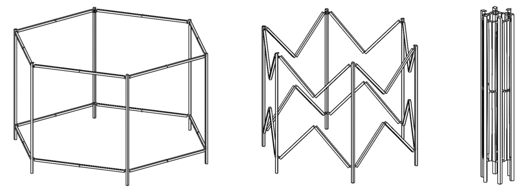

Figure 6: Folding Mechanism

The structure of the shelter exist of 6 vertical beams, combined with a foldable roof - and bottom construction. When pushing the vertical beams together, a compact version of the shelter is created. In this way it can be transported easy. When pulling the beams away from each other, a strong hexagonal shaped shelter is constructed. The structure is reinforced with 3 steel cables, each cable goes from a top corner to the opposite top corner. By implementing the steel cables, the team ensures the strength of the structure. In Figure 6 the folding mechanism is illustrated.

The team chose this system as it is easy to fold, no parts can get lost as everything is fixed, concomitantly with a strong structure.

6.4.2 *Thermal Protection & Ventilation*.

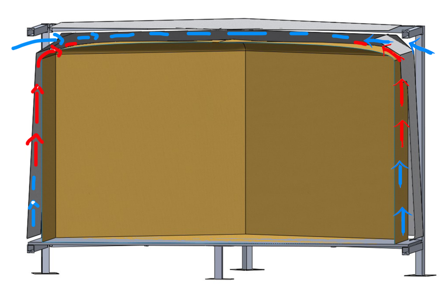

Figure 7: Airflow

The thermal protection is an essential objective as equatorial areas, the region where the shelters will be placed, have extreme weather conditions. During the day high temperatures can be reached, simultaneously with heavy rain falls. Keeping the shelter fresh and water resistant was very important during the development process of the product. Concerning to the humid underground, the vertical beams of the structure were extended to create feet for the shelter. The feet ensure that the floor of the shelter can't touch the underground and they provide a good ventilation underneath the shelter. Besides this, the team ensures that no water can enter the shelter as the people will live in a two-layered cocoon which is attached in between the folding structure. The two-layered cocoon is made of two types of cotton, the outer cotton is waterproof. Between both layers space is left where the air can flow. As warm air flows upwards, the team searched for a system so the air can leave. This problem was solved by not attaching the outer layer of the roof to the outer or inner layer of the walls, but stretch it between the beam construction of the roof. This makes it possible for fresh air to flow easy between the inner and outer layer of the roof and to refresh the shelter. As shown in Figure 7, the red arrows indicate the warm air going upwards and the fresh air (indicated by the blue arrows) entering the shelter between the outer and inner layer of the roof. The warm air will leave the shelter through the same space where the fresh air is entering. More ventilation is created by implementing a mesh fabric on the inner layer of the doors and by providing an extra window. The users ventilate their shelter by opening the outer layer and keeping the inner layer closed. The extra window is implemented to make sure optimal airflow is possible through the shelter.

6.4.3 *Modularity*.

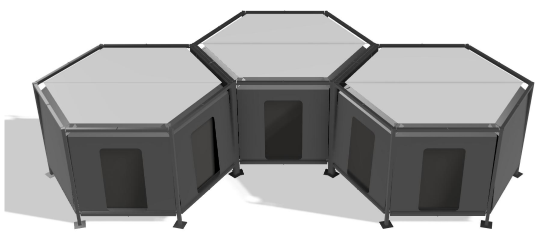

Figure 8: Shelter Modularity

As the main objective was to offer a safe place for the people and to keep families together, a honeycomb shape was chosen for the design of the shelters. This shape makes it possible to connect multiple shelters with each other and to create a community. Every shelter features three doors, all of them can be used to connect with other shelters. By using an extendable piece of fabric which has to be connected between two shelters, on the hand of a zipper, it is easy to attach them to each other. The three shelters are connected as shown in Figure 8.

6.4.4 *Packaging*.

An innovative way of packaging was pursued by using the floor of the shelter as storage box. The floor is used to incorporate inside of it all the necessary components for the construction of a shelter. To transform the floor into the box it was split in 5 parts which are able to fold as they are all connected to each other with hinges. The hinges allow the five parts to be a strong floor, such as a strong storage container. When using the floor as the container, an extensible steel clamp is used to clamp the upper parts together and to ensure all elements inside will stay intact. Considering that no extra materials will be necessary to use for the packaging, the

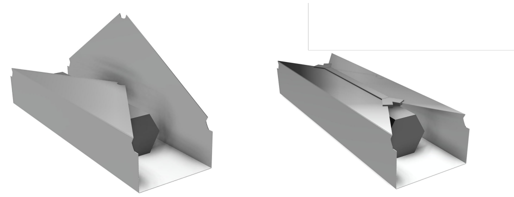

Figure 9: Storage Container

costs are considerably reduced, simultaneously with the impact on the environment. It also ensures an easy and compact transport. The storage container is shown in Figure 9.

6.5 Development

6.5.1 *Scale Model*.

Figure 10: Storage Container opening (model)

Figure 11: Half open structure (model)

The team decided to make a scale model to get a better view of how our shelter will look and to make sure all the parts were defined. Regarding the scale model the team was able to fit the compact version of the shelter inside the floor. Unfortunately we were not able to use the same materials. The materials which were used were wood for the structure and the floor, and cotton for the living cocoon. Only was layer was provided and the type of cotton differs.

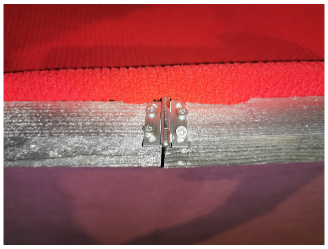

Figure 12: Hinge (model)

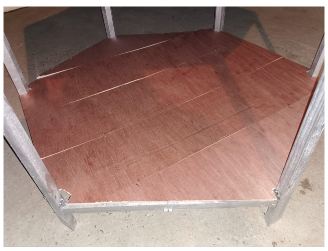

Figure 13: Open floor inside the structure (model)

Figure 14: Open shelter (model)

6.5.2 *Tracking Website*.

To make the communication easier between BIS and the shelter owners an app is needed. The best solution for this problem is to create a website with a built-in database. The website contains a way for the shelter owners to fill in information of the shelter. This information is saved in a database that can only be seen by the admins and the shelter owner that owns their specific shelter. The privacy of the website is protected by a login system that makes sure that only shelter owners and administrators can see the information on the website.

7 TESTS & RESULTS

7.1 Simulation Tests

In order to ensure that the final design is strong enough and will not break, simulation tests had to be performed in Solidworks™. The simulation is done with load requirements that the SafeBIS team set up.

Our shelter will house 4 people and their belongings. Regarding to the anthropometric measurements among Asian countries, the team calculated with a body mass of 81 kg per person as this is 95 % of the male population has weight below this [4]. An extra weight of 50 kg is added for the belongings and furniture. This makes a total load of 293 kg, which refers to a force of 2875 N. Two simulations were done concerning this load. The first one was to simulate this weight on the floor, the second one to simulate the weight on the structure. To calculate this second one, also the weight of the floor had to be added. A total load of 480 kg was founded. Converted to the force this is 4709 N. After doing the first runs of the simulation could be concluded that the model was too strong as it had a very high factor of safety. Regarding to this, the thickness of the floor was reduced from 20 mm to 10 mm and the dimensions of the aluminium beams from 60 × 60 mm to 50 × 50 mm. By reducing both materials, a lighter shelter was created. The shelter was still strong enough to carry the weight. Figure 15 shows the simulation of the structure. The blue colour indicates that the structure is strong in this case.

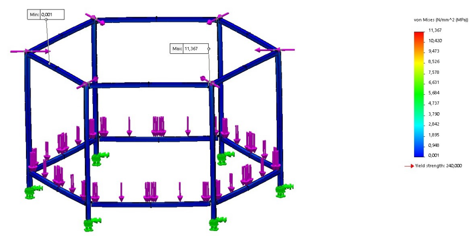

Figure 15: Simulation Structure

During the simulation the weakest points were identified as well. These points were at the hinges that connect all beams together and create the structure. This is logical as these are the smallest parts of the shelter and a lot of loads will be attended on it. The weakest point is illustrated in Figure 16.

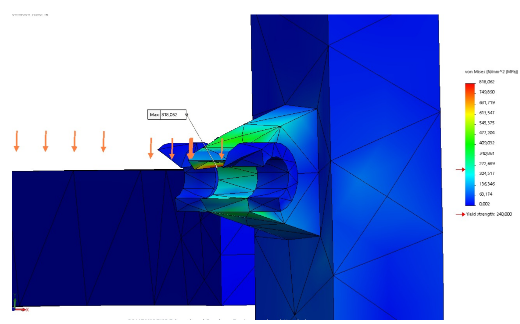

Figure 16: Weakest Point

Regarding to this results, the team designed hinges which would fit perfectly and which are stronger than the first ones. The hinges that were created have to be manufactured, the team will focus on this in the future. In Figure 17 the ideal hinge that connect all beams in the structure is showed.

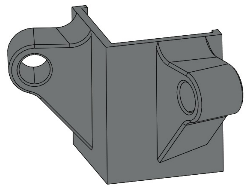

Figure 17: Future hinge

8 DISCUSSION

8.1 Simulations

An important simulation that had to be done, was one that is required by the UNHCR. They demand that a family tent for hot climates must be able to withstand 75 km/h wind, to be strongly attached to the ground and tensioned without any damages. When closed, the tent must give good protection against dust, wind, rain, snow, insects, and small crawling fauna. The team didn't succeed to do this simulation as it is very complicated to simulate wind in Solidworks™. Also the fact that the program isn't ideal to create fabric contributes to not succeeding to simulate this. In the near future it is very important to ensure the wind simulation can be done by using an other program or the prototype. This test is essential as the team wants to develop a completely safe shelter.
Concerning the simulation with the loads of the people and their belongings, good results were obtained. By doing this test, the team experienced that the construction and floor could be thinner as they were too strong. This simulation led us to reduce the total weight and certainty about safety.

8.2 Prototype

Due to the COVID-19 pandemic crisis, the team members had to work separately, and so it was not possible to make a 1:1 scale prototype. The team created a scale model to get a better vision of how the shelter would look and work but as we could not use the real materials, no tests were able to simulate with the model. This limited us to check the functionality of the shelter. Not knowing if the cocoon of cotton can stay inside to the structure while folding it to its compact version, is the first limitation. The team predicts that this will be possible but can't ensure it without testing. Being able to keep the cocoon connected to the structure while folding it would be an advantage as this facilitates the set-up. In case this would not be possible, the team has to provide the shelter with new attachment points so the cocoon can be detached/attached easy when breaking down/setting up the shelter. More time will be needed to do this. Not been able to test if the compact version of the structure and cocoon fits perfectly in the storage box, is a second limitation. So far the dimensions of the box were calculated using the dimensions of the folded structure with the addition of extra space for the fabric (cocoon). When looking to the scale model, a conclusion can be made that everything will fit 'normally' but this can not be ensured as the scale model wasn't made with the right materials. Only by making a prototype with the right materials, we can find out whether everything fits perfectly in the box or whether adjustments of the dimensions are needed. The scale model already provides a clear picture of the fitting of the compact structure in the storage container. The team focused on the implementation of ventilation in the shelter to be able to obtain a pleasant temperature inside. Also in this case, a prototype is needed to test the temperatures inside and to decide if additional ventilation is necessary. In the near future a prototype has to be made to check all above limitations.

9 CONCLUSION

9.1 Project Outcomes

The team set out to test the feasibility of creating a successful business surrounded the idea of providing safe unique temporary shelters, for people in areas affected by natural disasters. The team created a marketing plan to promote the foldable disaster shelter to target people and organisations. A detailed business plan was created to specify logistics, costs and funding, supplies, and target consumers. This allowed the team to fully specify the ins and out of the business to potential sponsors for future funding. In addition to the marketing plan, there were also goals of sustainability and ethical concerns pursued. According to the ideas the team started with at the beginning, the result is quite different. Starting with the design, the folding system and the materials used, they were optimised as much as possible, so that from the wood used for the whole structure of the shelter, the team agreed, following some tests, that aluminium is a very resistant material and with a much lower weight, thus streamlining the assembly of the shelter and its timely use. The folding system is more efficient and fast, avoiding the use of additional bonding materials and the use of too many materials. In terms of creating the shelter, the team has made a good start in refining the process and testing the concept. The entire shelter was developed and prototyped virtually, the functionality was tested using simulations however the team was not able to create a physical prototype of the shelter due to restrictions and time lags. Despite this, the team is striving toward a successful functional shelter. Concerning the virtual model, strength simulations were done and the results obtained led the team to modify certain parts of the shelter, so that, as mentioned above, due to the values obtained from the tests, the weight of the shelter was reduced, but the resistance remained very high. The weak points highlighted by the simulation were concentrated in the hinge area, but this was changed in the end, being made a better design of them. In general, the team is happy with the end result and will continue developing the shelter while striving for optimal safety. The team would like to investigate potential problems in order to prevent risks in the future and develop countermeasures for prevention.

9.2 Personal Outcomes

Regarding this one-semester learning experience, the team members shared the following opinions:

- "It was the biggest challenge ever thrown at me! Working with a bigger group then what I am used to and as a plus developing a product of which I knew nothing about was interesting to say the least. It was a lot of fun and invigorating but also somewhat frustrating at times. Throwing in a global pandemic in the mix made it extra interesting. But overall, it was an experience that I would happily do again!" – Eduardo

- "EPS represents an important step in my personal and professional development because I was integrated into an international team to design a product considering all the necessary aspects for proper functioning.Students are encouraged to present all their ideas so that they have the opportunity to acquire as much knowledge as possible. The information provided is qualitative, and the ISEP environment in which students study and work together is the proper one. Considering the problem that arose globally, the way of working became a little deficient, so that in some moments the results were delayed, but each team member cooperated as well as possible, and the seriousness and professionalism of the coordinating teachers counted for the completion of this project." – Andreea
- "I do not really know how to feel about this semester... The idea of travelling abroad and meet a whole new team of foreign students and have the opportunity to work with them on a technical project is an experience like nothing else, it was an amazing opportunity and I feel glad I could come to this wonderful city of Porto, which will stay in my heart forever. Unfortunately, I had to spend the majority of this semester in my room back in France, working with videos, laggy Internet, bad microphones and tools to share with the rest of my family... From a working perspective it was really affected and I can't lie saying it was a great experience, it was challenging and enriching but it was not as pleasing as I expected it to be. I hope that a pandemic will not happen anytime soon and I could not recommend more to people to come and do an Erasmus EPS in this wonderful city and great school that ISEP is. I am looking forward to see Porto again, this is a city like no other in the world." – Gabriel
- "Working together in groups to solve one problem is one of my favourite activities. Couple that with multiple internationals and you get the European Project Semester. The European Project semester was totally different than my usual projects. The European Project semester showed me the difference in cultures between several countries. It was really fun to work together with different study backgrounds and different cultural backgrounds. Due to COVID-19 I could not really enjoy the Portugal itself but I really liked the one month I stayed in Porto. The lessons online however became stale really quick. They were too long to hold my attention. Overall I recommend EPS to everyone but make sure there is not a global pandemic on its way." – Jelte
- "Doing an EPS is something that I would recommend to everyone who gets the opportunity to do a semester abroad. For me the semester was a wonderful experience filled with learning new skills, making friends, discovering a new city and trying to make the best of unpredictable situations. Having to complete a project together with 5 international students with a different background learned me to combine all individual qualities and to learn from each others disciplines. EPS was the first teamwork that I did with people that I have never seen before. It learned me a lot about how I functioned as a member in a new group and it revealed my own strengths and weaknesses. Concerning the pandemic that arose during the semester, I felt sad as we were unable to have the full experience in terms of exploring and enjoying the life in an other city, but in terms of the EPS project I think the virus did not affect it. ISEP took quick and proper measures and all supervisors did a great job while supporting and encouraging us as much as possible. All together it made the semester and the project successful." – Lore
- "EPS was a wonderful experience for me, having to work with people of different nationalities and different backgrounds. I learned a lot about teamwork, consistency in work, product development and I greatly improved my current field of knowledge. To add more, I believe that EPS did not only help me with my academic and practical knowledge, but I acquired some assets that can be useful in my life and made new friends that hopefully will last throughout my lifetime. One more thing I want to say, I know sometimes I was hard to deal with, both for the teachers and my team but at the end we created a wonderful project that I am really proud of. All of the team members did an amazing job and powered through all the challenges they were faced with. Keep it up guys and don't let anyone tell you what you can or can't achieve. " – Vladimir

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