

Stephen Mills
Homeless Utility Vehicle Project
2007-2008
Integrative Project

THESIS

I have designed a personal shelter in the form of a vehicle that can potentially be used by those experiencing homelessness. The vehicle is for the individual who has chosen not to take advantage of local community shelters. The decision to remain independent of housing initiatives creates a problem that deeply concerns me: a man or woman living on the streets with no shelter or heat source.

The Homeless Utility Vehicle (H.U.V) I have created is both a functional design and a display of activism. The result of this inspiration calls into question society's concept of shelter; thereby initiating a conversation about one of the most pervasive social issues faced in modern history. The vehicle is by no means a cure for homelessness but rather a concept piece that I have designed to explore the issue.

As the vehicle is fully functional, I was able to conduct a testing phase and record the reactions of the Ann Arbor community. The testing phase included my personal trials of homelessness which is a process I have developed to help me understand the life of a homeless person. I have shared my experiences through video, website, written documentation, and illustration.

After creating many to-scale models out of foam-core, wood and metal, I was able to predict the dimensions of my final product. For my full-scale prototype I used a number of different industrial grade materials such as plywood, steel and PVC based fibrous products.

The heat source for the vehicle is produced as a result of the body heat of the occupant. The wind is not a factor because the volume of the structure is fully enclosed when zipped. Initially, I planned on heating the volume of the structure with a wood burning stove, however due to the amount of wood contained in the base of the vehicle I decided to explore safer heating alternatives. The next heating option I considered was to incorporate an electrically operated ceramic heater into the structure. This was a safer method however a ceramic heater requires an electrical outlet, which puts significant limitations on locations where the vehicle can be used. The dimensions of the enclosed interior are relative to the volume of the occupant in such a way that the amount of heat released by the occupant is sufficient enough to cause an increase in the interior volume over a period of time.

CONSTRUCTION PHASE

Materials: For the lower half of the vehicle I chose a black PVC based Weblon fibrous material. The material is weatherproof, waterproof, water resistant, and fire resistant. It is used in a number of different commercial, marine, architectural and automotive applications. I chose a black opaque material for the privacy of the user.

For the top section of the vehicle I chose a clear plastic PVC based material. The choice for a transparent material was made to give the user visibility when pushing the vehicle. The clear material enables the user to see out into the world and be aware of their surroundings. This creates peace of mind and an added sense of security for the user. It is important to note that the clear material creates a greenhouse effect, which in turn acts as a heating method for the vehicle. Additionally the material is durable and protects the user from the elements.

MAIN COMPONENTS OF THE H.U.V

Base: The base is constructed from angle steel and 5/8" plywood. The weight of the Base alone: 118 ½ lbs.

Base of Vehicle



Metal Brace: There are two identical metal braces that run along the sides of the base. The braces act as sleeves for the plywood sides and give the vehicle its rigidity. They span the distance between the wheels.

Frontal Frame: The frame is made out of 3/4" MDX steel hollow pipe welded together. I designed the framework for the front of the vehicle according to the dimensions of the shopping baskets, as this structure is what holds the baskets in place. The shopping baskets are outlined in the feature section below.

Rear Wheels: For the two rear wheels I chose 26-inch heavy-duty cartwheels with tires that inflate to 111PSI. Each wheel/tire combination supports 300 pounds. I choose these wheels because they enable the vehicle to overcome obstacles such as curbs, potholes, staircases and mud. They can also tread effectively through deep snow, which is very important as Ann Arbor receives a great deal of snow in the harsh winter months.

Front wheels: For the front wheels I chose 8-inch pneumatic caster wheels filled to a similar PSI as that of the rear tires. The tread is thick for snow, mud, rain, and other undesirable conditions. The casters enable the vehicle to rotate 360 degrees. This allows the vehicle to rotate about a single point. Shopping carts contain this same type of wheel, as they are easy to maneuver and there are no restrictions on the turning radius. A great feature of these caster wheels is a foot brake on each wheel. This enables the user to park the vehicle on an incline, lock the wheels and prevent the vehicle from moving. The user activates/deactivates the brake by standing on the metal piece attached to each of the wheels.

Dimensions/ Weight of the H.U.V.:

Dimensions: The vehicle is 6.5' x 7' x 3'

Overall Vehicle Weight: Approximately 160lbs

FUNCTIONAL ELEMENTS OF THE H.U.V.

Collapsibility of Structure

The supporting structure for the transparent PVC material is comprised of three steel pole structures which are permanently attached to the base. The H.U.V. has the ability to have an open or closed canopy.

Collapsed



Upright



There are two arms which are inserted into corresponding holes on the metal framework to achieve a fully open position for the canopy. These arms are responsible for keeping the structure taut.

To collapse the canopy/structure it is necessary to remove the arms from the corresponding holes and allow them to hang freely. It is important to note that I attached the three pole structures to the base of the vehicle by using custom pivoting devices. These devices enable the three pole structures to pivot forward and backward when the user is erecting or collapsing the canopy.

In the summer months it is in the best interest of the user to collapse the foldable canopy because it would become too hot inside the vehicle if the canopy was up.

Mobile Upright Position vs. Sleeping Position: The mobile upright position is the primary position for the H.U.V. The secondary position is the sleeping position. The upright position is used when the vehicle is in motion whereas the sleeping position is used when the occupant is sleeping or wants to be fully enclosed in the space.

To achieve these two positions the base/floor of the H.U.V is divided into two-sections. The rear section is able to pivot upward with the use of a hinge mechanism. Instead of using a standard hinge I decided to use a dowel because it left no space between the two sections of the floor and enabled the rear section to pivot freely. I attached a welded dowel to a steel plate strip and then bolted the strip onto the plywood of the base's rear section. I then threaded the dowel through the metal frame. The dowel also provides the vehicle with strength and adds rigidity. It is an integral part of the frame. For the upright position there are also two custom made hinges, which keep the rear section of the base, locked into the metal framework.

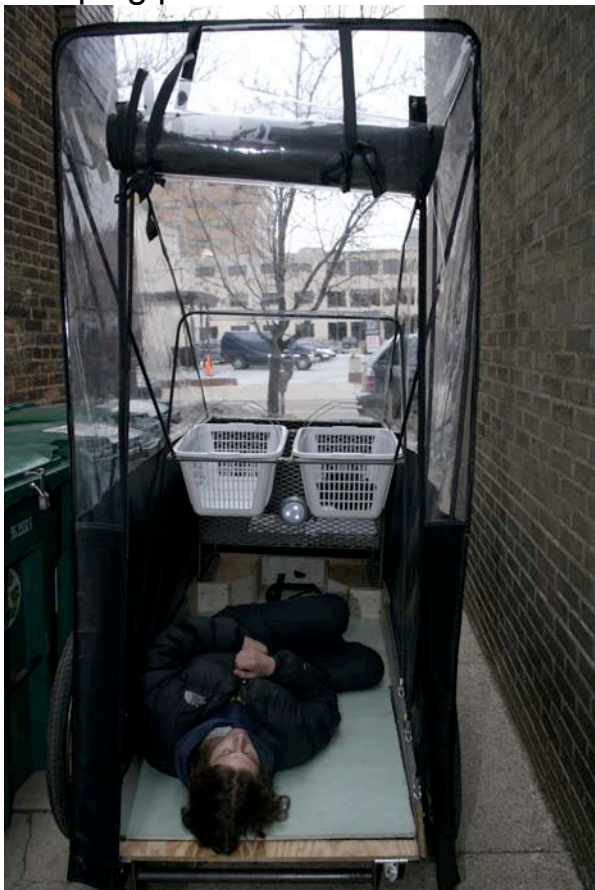
Mobile Position



A sleeping environment is created once the rear section is lowered down flat. This enables the user to completely enclose the inner volume through the use of double-sided zippers. Once there is an enclosed environment the space can be used for reading, relaxing sleeping, writing etc. Double sided zippers enable the user to zip the rear door open/closed from the inside of the vehicle or from the outside of the vehicle.

For the prototype I provided pillows and blankets as a basic amenity. I also equipped the interior with a light. It is a “tap light” which is battery operated and activates three LED lights when pushed on. The tap light is attached with velcro to the personal belongings bin and can be moved in situations where the user demands more direct light in different areas of the vehicle. Activities that might require such a feature in the nighttime are reading, writing and gathering belongings. The light is sufficient enough to enable the user to complete these tasks in the nighttime hours.

Sleeping position



As previously mentioned I used a 5/8" plywood base with 3/4" closed cell foam on top of it. It is velcroed onto the plywood so it can be easily removed and cleaned. When moisture comes in contact with the foam it is repelled and beads right off of it. The foam adds comfort for the user, providing them with cushioning and a dry place to sleep. In the tutorial section of my video I poured colored water on the foam, and the liquid beaded right off demonstrating how effective the foam is in repelling rain/snow and protecting the user from the elements. Additionally the foam prevents wood decay and increases the longevity of the vehicle.

Multifunctional handle: The handle is constructed from a 1 1/2" diameter steel pipe welded onto a piece of 3/16" steel. This is the standard diameter for handles on industrial equipment. The first function of the handle is to provide the user with a place to grip onto and steer the vehicle. The second function of the handle is to support the structure when the vehicle is in its down right position (sleeping position.)

Pull Strap: The pull-strap enables the user to get in front of the vehicle and pull the vehicle rather than being enclosed within it and pushing it. This is helpful when the user is traveling through densely populated areas. The user can pull the vehicle and at the same time interact with the public if a dialogue becomes necessary. It also enables the user to pull the vehicle up stairs, over a large curb or similar obstacles. The strap retracts into the vehicle from the inside when the user is not using it.

Pull Strap



Shopping Baskets- The two white shopping baskets are designed for bottle and can collection around town. In Ann Arbor most bottles and cans can be refunded for 10 cents each. For each of the two plastic baskets I incorporated two squeeze handles for easy carrying purposes. The baskets can also be used for carrying laundry.

Overhead view of Shopping Baskets and Personal Belongings Bin



Personal Belongings Bin: In addition to functioning as a storage unit the bin gives the frame a great deal of rigidity. The personal belongings bin is welded onto the metal frame structure in the front of the vehicle. I used diamond patterned mesh steel for each side thus creating the volume of the bin. The dimensions of the bin correspond to the vehicle's rounded inner shape and take into consideration the occupants space when the user is in a sleeping position. I was careful to allow enough space for the user to lie down without compromising the volume of the bin. The bin easily held my weight which illustrates its strength.

Personal Belongings Bin



TESTING PHASE

Upon successfully assembling all components of the vehicle I began the testing phase, which was conducted over a period of three weeks.

During this time I documented my experiences, brainstormed about what could be improved and reflected on what I appreciate about the vehicle. Elements such as cold weather, wind, snow, sleet, hail and other climate related inconveniences tested the viability of my design and sustainability of the project.

It was very interesting for me to test my creation because I was able to see firsthand what was successful about the design and what modifications could be made.

First Day of Testing: March 9th, 2008



Testing Reactions

Day 1: Temperature 20 Degrees Fahrenheit/Sunny

Over the course of four hours in an attempt to test the HUV, I pushed it around the streets of Ann Arbor. It served as a performance test for the vehicle and enabled me to receive a public reaction for the first time.

I immediately realized that certain parts of the sidewalks are uneven, I had not noticed these slopes as a pedestrian. As a result the H.U.V was pulling at some points and it was necessary to use additional strength to control the vehicle rather than simply steering and pushing. This became a variable in terms of control. I also noted that the locking mechanism I used to secure the rear section to the framework was not strong enough. After Day 1, I replaced this mechanism with two custom locking hinges. This modification was proven successful on Day 2 of testing.

When pushing the H.U.V for the first time it felt as though I was surrounded by a protective environment similar to that of a car. Although I was still a pedestrian with my feet pounding the sidewalk it is interesting to note that the vehicle altered my state of mind and increased my sense of security. I had to remind myself on several occasions to use caution when pushing the vehicle through traffic as it could have easily been destructed by an automobile. Sounds were muffled and

no personal interaction could take place while pushing the vehicle. It was only when I stepped outside the vehicle to rest or engage in conversation that was I able to interact with those around me.

Public Reaction



Day 2: Temperature 25 Degrees Fahrenheit/Overcast Early to Blizzard Conditions late afternoon

At around 2pm it began to snow. I hadn't checked the forecast but assumed it was just a passing snow shower. I was wrong. Before I knew it snow was beginning to accumulate both on the ground and on the clear plastic roof of the HUV. Significant accumulations formed over the next few hours. I was now forced to clean the snow off the clear plastic "windshield" with my glove to restore visibility for operating the vehicle. After pushing the vehicle through the snow covered streets/sidewalks I realized the vehicle was performing outstandingly well. The wheels treaded through the thick accumulation with no problems or issues to speak of.

HUV in Traffic



While pushing the vehicle for hours in the snow I was forced to cross many streets similar to a pedestrian. Toward the end of the testing day I was forced to cross a four-lane traffic street to arrive at the homeless shelter. With snow accumulating on the sides and external canopy of the HUV my visibility was limited. With the poor road conditions and cars struggling to find traction I realized it would be a smart idea to get out of the vehicle and use the tow strap to pull the vehicle across the street. The conditions were so poor that cars were having a great deal of trouble climbing up a hill that I was also on. These cars were being pushed by a group of homeless shelter attendees. I noticed a tourist bus was unable to scale the same hill, its wheels spun freely through the slop on the road. The bus ended up having to turn around, even though three men from the homeless shelter attempted to push it up the hill. I then towed my HUV across the four lanes of traffic and had one of the nearby homeless shelter attendees from the same group stop traffic for me.

Pulling the HUV



He even tried push my vehicle which I also thought was comical but friendly of him. Shortly afterwards I arrived in front of the homeless shelter entrance. I was greeted by members of homeless community who reacted to the H.U.V. with great deal of enthusiasm. I informally presented the functionality and ideas behind the project and let some of the members physically interact with the vehicle. Once I managed to push the vehicle back to the UHAUL truck I felt a great deal of satisfaction and joy as well as accomplishment.

Day two of testing served as the ultimate test for the vehicle and it passed with flying colors. On this stormy day the durable materials of the H.U.V. served their purpose well as my only contact with the elements was my feet touching the ground below.

Night of Testing: Asleep in the H.U.V

Nighttime view inside HUV



Pushing the vehicle around town and discovering what was successful and unsuccessful about it helped me modify elements of the vehicle. Receiving a public reaction while pushing it through downtown streets of Ann Arbor had given me an outsider's perspective on my project. Since a main component of the vehicle is shelter the intended user is expected to sleep inside it at night I felt it was of great importance for me to test this facet of the project.

One cold night in early March when the temperature was in the low teens, I embarked on a mission to sleep in the H.U.V while it was parked in my friend's backyard. I pushed the vehicle into the backyard and climbed inside of it. I zipped the zippers down and crawled under the blankets. I then got up and reached into the personal belongings bin to grab my notebook and pen. I un-velcroed the tap-light from the personal belongings bin and turned it on. The light acted like a "flashlight", enabling me to navigate around the vehicle and collect my belongings.

I then situated myself back under the blankets and started writing in my journal. My nose began to run and I could see my breath condensing in the air. With each breath I exhaled I could see as a miniature cloud inside the vehicle. I was cold but not uncomfortably cold. As time went on I became even more comfortable with the temperature as the temperature did rise within the vehicle. I was tired at this time so I wrote in my journal for just a few more minutes to take notes on my feelings at the time. I could see the sky above me as I lay down. I could only see my immediate surroundings through the back of the vehicle. I felt out of harms way and I secure about my present living conditions. I heard noises of cars passing by in the distance. I did feel somewhat vulnerable as I was arguably defenseless against an intruder. I finally decided to go to sleep. I shut my eyes, laid my head down and curled up under the blanket.

I woke at 4AM and was startled by my unfamiliar surroundings, I then realized I was in the HUV. I immediately jumped up, looked outside the vehicle and began to unzip it with a great deal of anxiety. I wanted to make sure that the reason I awoke was not related to any imminent danger. I walked around outside. It was still dark and cold. It felt much warmer inside the HUV. I noticed this immediately when I stepped out of the HUV and onto the lawn. After walking around the property briefly, I realized that my surroundings presented no noticeable dangers. I then returned back to the HUV, got inside and zipped the rear door back down. I turned the LED light back on and laid with my eyes open for a bit staring into outer space. After a few moments of collecting my thoughts I turned the light off and went back to sleep.

I was fascinated by the eerie green glow that the light gives off through its LEDs. It creates a relaxing almost comforting atmosphere in the nighttime. This experience is hard to appreciate without actually witnessing it firsthand. I did fall back to sleep and awakened a few hours later in the early morning. I opened my eyes to the sky, which was milky gray with a hint of early morning yellow haze from the sun. It was now time to wake up. I had successfully spent a full night in the HUV and the trial was complete. I could smell the grass, which surrounded me with a moldy odor and a distance airplane droned from the sky above. I got up, stretched and almost fell over as my body was quite disoriented from

sleeping in the vehicle. I was a little bit sore and stiff but not in pain. I also was not cold although my body was aware of the external temperature.

I unzipped the vehicle's rear door and climbed out of it. I felt the wind hit me, which was a new sensation as the vehicle had protected me from it all night. It was similar to walking out of my house and into the world.

PUBLIC REACTION

As I am the sole designer and producer of this vehicle I am responsible for addressing the public's concerns and answering all questions about my project. I believe mobile art to be an extremely effective means of generating stimulated responses from the public. As my art form is not confined to boundaries or limited to one specific location there existed a potential to be noticed by a large audience.

Presentation to PORT



One thing that remained consistent was the high level of enthusiasm I received from members of the homeless community in Ann Arbor toward the idea of the project. That alone was enough for me to have the level of determination and perseverance I needed for executing my designs.

As I walked down the streets of Ann Arbor my vehicle made a bold statement. From the perspective of a passerby the vehicle is a uniquely shaped cart that can be pushed and maneuvered around freely. Onlookers were intrigued and frequently inquired about the purpose of the vehicle and its context within society. I eagerly explained the concept to members of the Ann Arbor community and made them aware of my project. Additionally, I distributed postcards I had labeled by hand with my URL www.homelessvehicle.com.

I looked forward to encountering members of the homeless community on my journey around town, as I was familiar with many of them from my interviews and was eager to see their reactions to the final project. Many of them were excited to discuss the final product with me, which was a rewarding experience.

Day 1: On day one, some people gawked, some stopped what they were doing and stared and others did not notice me. I explained the H.U.V to two homeless men that I am familiar with. They both were entertained by the idea and presented questions for me. Warmth, sleeping and functionality were all topics of discussion. It is fair to say that the H.U.V initiated a dialogue between the homeless community and myself.

Day 2: Day two began when I unloaded the H.U.V. off a U Haul truck on 4th Street in Ann Arbor. Immediately I found myself surrounded by people who were by intrigued by my project.

My initial goal for day two was to park outside of Project Outreach and informally present my project to members of the homeless community as well as the staff at Project Outreach (P.O.R.T). Shortly after I arrived a member of the P.O.R.T team noticed the vehicle and the entire team came outside to greet me. I then informally explained my creation through demonstration and fielded questions. I allowed people to get inside the vehicle to interact with it, and spoke about the functionality of the design and the purpose behind the project.

The Director of P.O.R.T brought up the topic of grants and expressed a genuine interest in possibility of a fifty thousand dollar grant to fund further development of my project. Additionally, P.O.R.T expressed interest in having me produce seven or eight more of these vehicles to be issued to specific members of the homeless community of Ann Arbor.

Shortly after my presentation at P.O.R.T I was approached by Taron Burriss. Taron is a news reporter and producer for WOLV-TV and OSTN news. WOLV-TV is a local Michigan station, which focuses its broadcasts on news stories pertaining to Ann Arbor, the University of Michigan and the surrounding towns.

OSTN News network is a student TV network that broadcasts in the USA, Canada and the UK.

Interview with Press



Over the course of eight hours Taron joined me as I pushed the vehicle around what is considered downtown Ann Arbor as well as the University of Michigan's Central Campus. The idea behind this journey was to get the reaction of college students, locals and people who are currently experiencing homelessness. Taron and I conducted approximately thirty joint interviews with people we randomly encountered that day.

The most memorable interview conducted on day two was with a couple that had previously been homeless. In the interview they claimed that if they had access to a vehicle like the H.U.V. then they would have been able to overcome homelessness in a more timely fashion. They concluded that the H.U.V would have provided them with shelter and warmth allowing them to sleep in the evening and search for work in the daylight hours. I realize this is an extremely bold statement on their part however I feel it is an interesting statement and should be noted in my research.

WEBSITE

www.homelessvehicle.com

I created my website as a portal for people to learn about my project and efforts over the past eight months. The website currently includes nine pages which each explain a different facet of the project. I want the visitor to get a good sense of the H.U.V. and understand why I created it and the direction it is heading in.

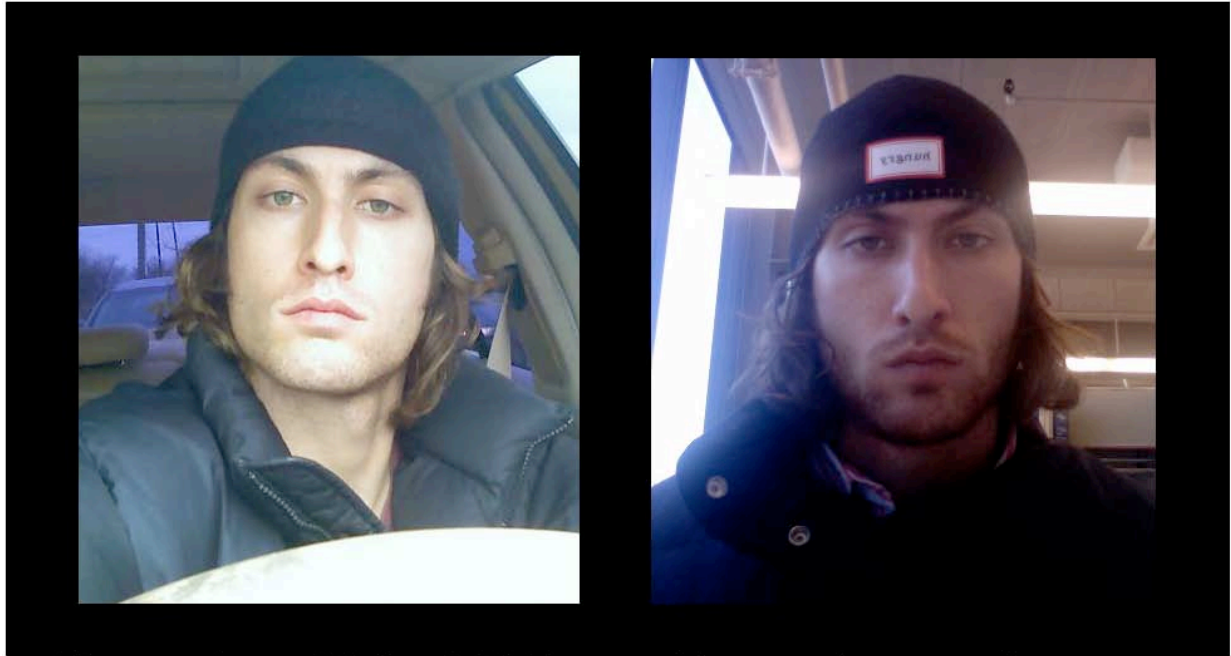
The website also enables the visitor to contact me. I feel it is my responsibility to enable visitors to inquire about the project, send me feedback and receive answers in a timely fashion. I have posted my cell phone number, a site-specific email address and even an instant messenger screen name that they can message me on. Making myself available to people who are interested in my project I feel is very important. I have and will continue to use my website as a tool for promoting my project. I am developing strategies for informing the public about my website domain. To promote the website thus far I have hung a large banner above the H.U.V. gallery exhibition and distributed postcards with the URL. I have also used word of mouth and my network on facebook.com.

SUPPLEMENTS TO THE H.U.V PROJECT

TRIALS OF HOMELESSNESS

To better understand what being homeless feels like I have developed something called "Personal Trials of Homelessness". The Personal Trials of Homelessness consist of a series of different restrictions implemented on my daily lifestyle. I have documented three different trials. The first trial involved going two weeks without shaving or cutting my hair. In the documentation I noted that during this time I was shunned by the public and my self-confidence decreased. I also noted how amazing it felt once the two weeks were over and I was able to shave on a daily basis. I was grateful to once again be accepted into society.

Shaving Trial



November 13th, 2007

November 27th, 2007

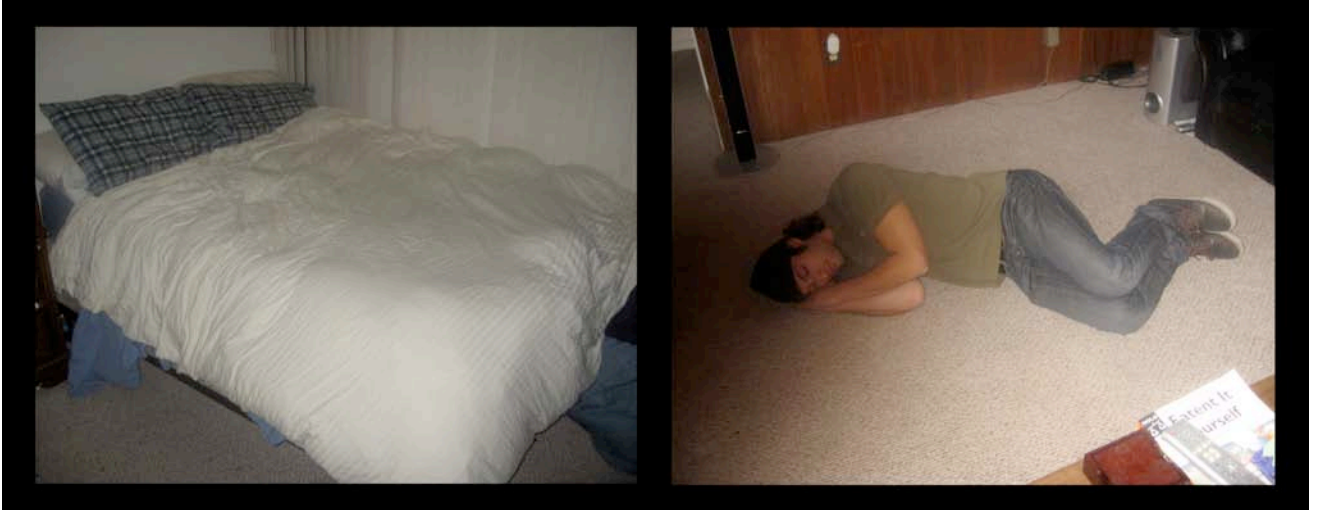
The second trial involved sleeping for one night in a freestanding trailer. This was effective because the trailer had an inner volume which was only a few cubic feet off from the volume of my Homeless Vehicle. I documented the sounds I heard, how safe I felt, the odors, the cold weather and my dreams. I also noted how the lack of visibility to my surroundings made me feel as the trailer did not have any windows. I almost felt as if I was a prisoner because I was not able to see what was going on around me and I was confined to a given space. I was able to apply this "Trial of Homelessness" to my construction of the H.U.V. My design has privacy material on the bottom so the occupant sleeping cannot be seen, however unlike the trailer there is a clear plastic PVC material which creates visibility for the user.

Trailer Trial



The third trial involved sleeping on the floor of my apartment for a week without blankets or pillows. I documented how much pain I was in as I woke up each morning. I experienced muscle aches, back pain, and dust allergies. I noted how uncomfortable the ground was compared to my nice soft bed and how unfortunate it would be if one had to sleep on a piece of cardboard or even on the hard, bare, cold ground each night.

Sleeping Trial



In addition to the individual “Trials of Homelessness” I have also developed something called the “Lifestyle Restricting Dice”. I chose a dice as a way of illustrating the idea of chance. The purpose of throwing the dice is to roll a number that corresponds to a specific lifestyle restriction. For instance if I roll a 5, I will have to sleep on the ground for the night. If I roll a 3, I won’t be able to wear a jacket in the cold winter weather, if I roll a 2 I will be forced to skip a meal. Day to day homeless life can be very unpredictable with problems arising each day. I felt by incorporating a tool such as a dice to illustrate chance it would bring me closer to understanding the fundamentals of homelessness.

Image of Dice



These trials served as a supplement to the physical construction of my vehicle and enhanced my understanding of homelessness.

INSPIRATIONS AND REFERENCES

I have read and viewed a number of books, online articles and documentaries relating to my topic of homelessness and critical vehicles. Books relevant to the topic of homelessness such as Critical Vehicles by Krzysztof Wodiczko, Side Walk by Mitchell Duneier, Tell them who I am: The lives of Homeless Women by Elliot Liebow, and the documentary “Skid Row” by Pras from the Fugees have increased my awareness of what being homeless really means. I was very inspired by artist Krzysztof Wodiczko who issued Homeless Vehicles to members of the homeless community in 1988 for testing. Unlike Wodiczko I tested the vehicle myself rather than distributing it to members of the community.

I feel the social interaction with the homeless was extremely beneficial to my project. The information I received from these interviews served as a foundation for the design of the project. I intend to continue research on this topic well as continue to volunteer at homeless shelters and maintain a level of communication with the local homeless community.

Initially when I embarked on this project I had many personal stereotypes in mind regarding the homeless community. I did my best to recognize those feelings of prejudice and judgment for what they are and separate them from my project. I produced an original design, which means I brought a vehicle into existence. This project has opened my mind, challenged and enlightened me.

Bibliography

Wodiczko, Krzysztof. *Critical Vehicles: Writings, Projects, Interviews*
Cambridge Massachusetts: The MIT Press, 1999.