ZEBRA MACHINE

Critique and reaction to the car dominance in the public space of Rotterdam: a public intervention

PROJECT DOCUMENT Lieke Muis van der Meer Graduation Project June 2021 Spatial Design - Public and Private

INTRODUCTION

4

1. CONCEPT

6

2. LOCATION

7

3. PAINT MACHINE

9 intro paint flexibility distribution weight connections and build up frame paint supply

4. ACTION

21

REFERENCES

22

The practice document that you are reading now is part of my graduation project. First, research has been done to the implicit barriers that are faced by the users of the pavement in Rotterdam. The findings of this research form the basis and inspiration of the practice project. The project, that results in a public intervention, critiques the current state of the public space in Rotterdam that prioritises space that facilitates car centered mobility over of the movement of the users of the pavement. The research document will inform you more elaborate on this.

This document will present the ins and outs of the practice project. First it will elaborate on the concept of the public intervention. For this intervention, a painting machine is designed. Specifications on this design can be found in the following chapter. The final chapter elaborates on the actual act of the intervention. The practice project is communicated in real time in public space. The visible appearance of public intervention itself is in public space, to be seen by whoever passes the place. The intervention is also photographed and filmed to be able to share the intervention with the Willem de Kooning Academie and people unable to pass by the place.

Since the public intervention takes place two days after the deadline for this document, it is not possible to show images of the action and the outcome yet. This will stay a surprise for later...



Little quick sketches of previous designs



My project critiques the dominance of the car centered mobility in the public space of Rotterdam. The research that contributes to this project, presents how the users of the pavement are repeatedly confronted with this dominantion that creates moments of hindrance and stress in their movement in public space.

The governmental-controlled infrastructure shapes the current appearance of the public space in Rotterdam. This infrastructure is based on the concepts of efficiency and speed that prioritises the spatial structures that facilitates car centered mobility. Privilegding this in the city creates spatial, social and economic separation (Jacobs). Traffic vehicles, bicycles and users of the pavement are assigned to their own space. This separation generates inferiority: if you have not the resources to have access to a car, a lot of square meters in public are not accessible to you (Sennet 183). Even more, the noise, poisonous emissions, accidents and its emotional toll create an environment that exposes many people to the highest level of violence they will experience in their life (Culver 148). The current appearance of public space limits itself from being truly public.

In consequence, I want to disrupt the current hierarcy that places car centered mobility over the users of the pavement and prioritse users of the pavement instead. The most tangible confrontation in the hierarcy of the realm of mobility happens when users of the pavement want to cross the street and are hindered by the flow of the traffic vehicles. However, the zebra crossing is the space where the hierarchy is different. Here the traffic vehicles have to stop their flow and give space. On the other hand, the users of the pavement repeatedly have to change their direction and make detours to the zebra crossings, have to wait for vehicles to stop and their ability to cross the street safely depends on the attentiveness of vehicle drivers.

Disrupting the current situation along the entire length of the street is just a very small step. Strethcing the white lines of zebra crossings along the entire length changes the practice of the street. Without taking the space from traffic vehicles, more attention is put on the users of the pavement and the dominance of car is disrupted.

Thus, I will present this critique by offering a simple solution to the city in the form of a public intervention. With ecological and temporary paint, I will stretch the lines of the zebra crossing along one street. Where and how I will do this, is explained in the following chapters. The location for the public intervention is the southernmost part of the Mathenesserdijk in Rotterdam. The street finds its end at the Schiedamseweg. The Schiedamseweg turns into the Nieuwe Binnenweg just at the other side of the river the Schie. The Nieuwe Binnenweg and the Schiedamseweg are lively streets that are in direct connection with the city centre. You can find shops, restaurants and bars along these streets. A lot of moving agents flow through: cars, tram lines, bicycles and users of the pavement.

Two of the participants contributing to the research I did, walked along the Schiedamseweg or the Nieuwe Binnenweg. They both experienced implicit barriers along these streets that concern traffic and crossing the street, therefore I started to look around this area.

The Schiedamseweg or Nieuwe Binnenweg are, however, too crowded to execute the public intervention. Also by night, cars keep driving through and would damage the paint in the mintures before it dries or would have to be blocked and create a traffic jam that would draw too much attention to the activities and signal municipal authorities and the national police. Therefore, I chose a location that is more quiet by night, but very much connected to the liveliness of the Schiedamseweg and the Nieuwe Binnenweg.





Picture 2: location on map Rotterdam (Google Maps)

This part of the Mathenesserdijk is 120 meters long, 3,60 meter wide and hosts housing, offices and restaurants. Two cafés are located on corners of the junction between the Mathenesserdijk and the Schiedamseweg. They bring liveliness into the Mathenesserdijk. Since the Mathenesserdijk is a one-way street, traffic needs to be blocked at one side of the street only due the public intervention, which is very convenient. Furthermore, the typology of the buildings along the streets were a criteria for picking this street. I want the location to feel urban and not like a village. Three or more level buildings help communicate an urban atmosphere. Next to that, the imagery of the public intervention communicate the concept better when the pavement is also connected to the zebra lines and not blocked by parked cars. Almost all streets in Rotterdam have parking along both sides of the street. Fortunately, this part of the Mathenesserdijk has parking along one side only and on the other side only partially.







intro

The paint machine meets certain requirements. First of all, the action of painting the streets has to be quick. Therefore, the machine has to operate fast and be quick to build up and break down. It should be easy to transport the machine. And, of course, it should paint properly. This chapter is split up in various sections that are key elements of the paint machine.

The paint machine draws white stripes of 50 centimetres wide with a gap in between of also 50 centimetres, following the measurements of the national zebra lines.



paint

Streets are in close connection with the ground and ecological system. Therefore, I wished for the paint for the zebra lines to be eco-friendly and not harmful for the environment when it washes away or is eaten by organisms. I did tests with flour, cornstarch, chalk and water to create the best paint. Chalk turned out to score the best on drying speed, whiteness and appearance. The final paint is a mixture of calcium carbonate (CaCo3 or chalk) and water. Calcium carbonate is a natural white substance found in limestone, marble and other rocks and shells. It is used as medicine for the stomach and bowel. Calcium is an essential nutrient for the bones and teeth as well.



Figure 1: scheme to overview the paint tests



Picture: Calcium carbonate as rocks



Picture: paint mixing station



flexibility

The surface of the street is not levelled. There is a slight curve that ends lower at the sides of the street and higher in the middle. The speed bump creates a slope in the surface. And the tiles are tilted sometimes. The paint machine is designed to adapt to the changes of the surface. To achieve this, the different paint rollers are moving separately from each other. One roller can move from a horizontal line to a diagonal line. To keep the connecting plates from moving left and right, metal rings on the inside and pins on the outside provide them from sliding. There is a little space between the ring and the pin, so that the diagonal movement is still possible.

To achieve the right angles and length of the connecting plates, many tests were needed.





Diagonal movement



Pins and rings



Separate moving paint rollers

distribution

This was probably the most difficult part of the paint machine to figure out: the distribution of the paint on the surface. The paint flows through a garden hose to a pvc tube in which holes are drilled in order to let paint drip onto the paint roller. Many parameters were involved:

- diameter of the dripping holes that distribute the paint over the paint roller

- where the paint enters this tube with holes
- diameter of this tube compared to the diameter of the hose
- amount of paint entering the hose
- height of the paint level in the tank from which the paint enters the hose
- thickness of the paint

The final design founds its balance between all these parameters so that the pressure of the paint being pushed out the holes is equal along all the holes. For this the diameter has to be 1 mm and not more than 28 mm in total. The surface of the holes in the pvc tube have to be the smallest area compared to the rest of the system in which paint flows. So that the highest pressure of the system is at the dripping holes.

Only one entrance for the paint is necessary and the tank always has to be filled with a certain amount of paint, so that the pressure of the paint flowing out is stable. The thickness of the paint is not too thin so it would not colour the surface and not too thick so it would limit the distribution of paint on the surface.

Various machines were built to come to these conclusions (see pictures in later pages).



Picture: towards final design



Picture: final design



1 > Paint machine with a braking system to adjust the amount of paint flowing in.

During all tests, I played with the amount of paint and its thickness to change the parameters. When the paint was too thick, the distribution of the paint over the surface was poor. Thin paint, however, is not colouring the surface enough.







2 > Paint machine with middle entrance and amount of tested by taping over some . The main problem with this machine was that the paint was only leaving at the middle of the tube. Less or more holes were closed by tape. The gradually placed tape tries to bring the paint to the edges of the tube. This was not solving the problem.



3 > Paint machine system that has three entrances of paint that supply pain. The the triangle splits the supply into two, that changes the pressure again. The outcome of this set up was not satisfactory as well.



weight

Usually, when you are painting with rollers you press with your own force the roller on the surface. By doing that the paint leaves the roller and distributes to the surface more equally. The rollers by themselves don't have enough weight to do so.

Various options to add weight to the roller were tried and calculated through by using the density of steel and sand. Since the connecting plates create a lever, adding material further away from the axle that with the wheels make it able to use less material. However, for aesthetic reasons the best solution seemed to be adding steel tubing around the axle inside the roller. Together 3,3 kg is added here to press down the roller on the surface.



Testing weight by creating a platform to put things on with a weight, like this bottle of ketjap., Surprisingly heavy.



Too much weight made the roller slip. The right weight was tested to be between the 3 - 4

The first part has no weight added, the second part does and looks better.



Creating a new axle to add more material slight hanging over the roller to create pressure. The additional material creates a sideways load on the tilting mechanism.

kg.



connections and build up

The paint machine is build up at the location of the public intervention. The separate pieces are transported by cargo-bike. Each paint roller can be divided into a piece. The fork that consists of three pieces. These pieces are put together by pins. As shown in the picture below, I welded a spot metal on the tube. The inlet in the tubes fit precisely around this spot. This makes it easier to know where the tubes need to go in order to fit in the pin that keeps the tubes together. Simultaneously, the pins keep the fork or the connecting sheets in place.



Six main pieces



Connection systems

The garden hoses are connected with hose coupling systems, the supply tank with paint and the pvc tubing.





frame

The cargo-bike is part of the structure of the paint machine. It will give space to the paint supply. Using the cargo-bike to move the paint machine is more stable than walking or using a two wheel bike.

Steel tubing are the basis of the frame that holds everything together. The frame is connected with a rope to the towing hook of the cargo-bike. The rope functions as a hinge, so that the movements of the cargo-bike can be followed by the rest of the frame.





Grinding, sawing and TIG welding: main activities for building the frame

paint supply

The front box of the cargo-bike offers place for the paint stock. To keep the right pressure in the garden hoses, the refill of paint has to be done precisely. During the public intervention, someone sits in the box and fill the funnel that leads to the supply at the back of the bike. Gravity brings the water from the higher funnel to the lower supply box. The garden hoses that feed the paint rollers with paint are connected to this supply box. To make is more easy to read the required level of paint, a marking is attached to this supply box.

Flow of paint

The public intervention itself takes place around 5 AM on Thursday the 17th of June. This time is picked for the reason that the action itself will draw less attention during the early morning on a work day and has to dry before being used. To provide clear images, I chose to do the public intervention early in the morning when the sun has come out already, instead of the night (which also would be a quiet time to do the action).

With a crew of seven people we can complete the action within 20 minutes. The various tasks are:

- riding the cargo-bike

- sitting in the box of the cargo-bike and refilling the supply box through the funnel

- photographer
- filmer
- traffic regulators
- coordinator and overview keeper

The various tasks and info around their jobs will be communicated with the group. We meet upfront to meet each other and talk the plan through. During this meeting, I show maps like the ones on the right and photos to clarify the ins and outs. With some that are not familiar with the location, I will go there before.

I am very grateful for the people that are involved in this public intervention. It would not be possible to complete the action without them. It makes me very happy to be able to share the experience of the project with them.

Painting route and the dotted line represents the route to the place where the build down will take place of the painting machine

Locations build up and build down of the painting machine

Starting points for the different persons responsible for different tasks

Culver, Gregg. Death and the Car: on (Auto) Mobility, Violence and Injustice, vol. 17, no. 1, 2018, pp. 144–170., doi:https://acmejournal.org/index.php/acme/article/view/1580/1429.

Jacobs, Jane. The Death and Life of Great American Cities. Jonathan Cape, 1961.

Sennett, Richard. Building and Dwelling: Ethics for the City. Farrar, 2018.

Performance with Zebra Machine at Hour Zero. Picture by Anna Theunissen