

Præsentation af et projekt om optimering af cykelparkering i Indre By

Til møde i Indre By Lokaludvalg 9. juni og Christianshavns Lokaludvalg 22. juni.

Miljøpunkt Indre By - Christianshavn har i perioden medio marts til primo maj 2016 haft fire studerende fra Worcester Polytechnic Institute, USA, til at arbejde med problematikker omkring cykelparkering i de smallere gader i Indre by.

I rapporten gennemgås problematikken om, på den ene side målet om at være verdens førende cykelby, og på den anden side problemet med at have muligheder for at parkere cyklen.

I projektforsøget har de studerende observeret, lavet dataindsamling og interviewet interessenterne; de cyklende, områdets beboere, øvrige besøgende, erhvervsdrivende, Københavns Kommune (henstillede cykler) og mange flere.

Resultatet af undersøgelsen viser et billede af en kendt problematik omkring flere cykler, end der umiddelbart er plads til at parkere, at problematikken er større end det tidligere har været dokumenteret og endelig en række forslag og anbefalinger til mulige løsninger.

Miljøpunktet præsenterer rapporten og anbefaler lokaludvalget at drøfte muligheder for at bruge resultater og anbefalinger for at skabe bedre og flere muligheder for cykelparkering i Indre By.

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Notes for Presentation:

Introduction

- Students from Worcester Polytechnic Institute

Background: Copenhagen - The City of Cyclist

- Copenhagen the self-proclaimed city of cyclists has set the goal of becoming carbon neutral by 2025 and in turn taken on the challenge of becoming the top bicycle city in the world. Today cycling is the most popular form of transportation with 45% of Copenhagen's commuters cycling to work or school each day. While this a 10 % increase from 2011, and brings the city closer to its goal of having 50% of daily commutes take place on bicycles. It also comes as a cost as the city now faces congested bicycle parking.

Background: The Problem

- Initial observations of the area showed a lack of parking facilities due to racks seemingly always being filled with bikes so no one could use them
- This caused people to exhibit problematic parking habits such as parking against poles, walls, and in front of windows
- This congested sidewalks, making it less safe for people to walk down the street, and lowered the window value of shops in the area
- 71% of Copenhagen Cyclists unhappy with bicycle parking

Background: Existing Parking Solutions: Physical

1. Sunken Bicycle Beds

- Provide 2,100 bicycle parking spaces at Norreport Station
- Sunken bicycle beds lowered 20 to 30 cm into ground in order to avoid obstructing the view of passing pedestrians
- The location of each sunken bicycle bed place in area easily accessible and convient for the 20,000 cyclists coming through each day

2. Bicycle Cellars

- Underground parking facilities in Metro stations
- Due to inconvenience of bringing a bicycle down stairs bicycle cellars are not very well known or used
- Quick fix system provides a metro ticket as a substitute form of transportation while bicycle is under repair
- Metrobike system allows cyclists to rent out their own unused bike in exchange for a free metro-ticket
- Workshops held in bicycle cellars to use space in engaging way
- Last three workshops include choir, Tai-Chi, and a DIY bicycle repair workshop

3. Flex parking

- When both cyclists and motorist share a parking spot
- Test site outside of Ingrid Jepersen Highschool
- 7 to 17 the flew parking designated to bicycles which include the students riding to school

- 17 to 7 the flex parking is designated for cars which include residents coming home from work and parking over night
- Only successful when the demand for parking of the cyclists and motorists occur at different times

Existing parking solution: Psychological

1. Bicycle Butlers:

- Organize and MOVE illegally parked bicycles to proper spots
- Cyclists get angry when you move their bike
- Came up with a Brilliant idea to help organize bicycles and keep people happy
- All the illegally parked bikes that are relocated will get their chains oiled and their tires pumped.
- It is thought that if a poorly parked bicycle is moved five times, the owner will eventually be nudged to park properly
- People taking advantage wouldn't be rewarded.

2. Shop-owner Signs:

- A second way Copenhagen has tried to discourage bad parking habits it through signs
- These two signs come from the piercing store on Studiestraede.
- Cyclists do not listen to signs due to no enforcement of them

Mission Statement:

- This project is designed to assist Miljopunkt Indre By-Christianshavn in their efforts to continue to improve the environmental sustainability of the inner city of Copenhagen by exploring possible bicycle parking solutions.

Objectives:

1. Assess the current parking habits of cyclists
2. Identify the needs of all stakeholders
3. Propose final bike parking recommendations

Studiestraede:

- This street consists of bars, food, shopping, residential buildings, and a school
- Three bicycle racks that provide 81 parking spaces
- In order to record all activity split street into 4 zones

Objective 1:

In order to develop practical bike parking solutions for the narrow streets of Copenhagen, we first had to assess the current habits of cyclists. This was a four part task which included flow counting, monitoring the demographics, hourly observation of racks and our own bicycle tagging experiment.

Flow counting/Demographics:

By splitting up the street into the four previously mentioned zones, we were able to place one group member in each zone and get a full view of Studiestraede at once. This was done in four hour intervals from times ranging from 6 am to 9pm for both weekdays and weekends. During this time we counted the total number of bicycles parked in each zone hourly, as well as the amount of bicycles that parked and left the area in-between the hours. We also paid attention to whether the cyclists parking were male or female, older or younger, and if they rode a cargo or regular bike.

Hourly Observation:

Hourly observations were used to monitor the use of the bicycle racks on the street. We did this using the previously mentioned time frame of 6am to 9pm and our four created zones. On each hour we counted the number of total bicycle parked in each zone as well as how they were parked. Whether that was in a designated spot, on the front of the rack or inside the rack but not in a designated hoop or if the bike was parked outside of the rack and on the sidewalks or streets. The distance bicycles that extended from the rack and into the street and designated car parking spaced were also measured.

Bicycle Tagging Experiment:

After a few days of collecting data we realized we saw many of the same bicycles parked in the same spot each day regardless of the time, this led us to create our bicycle tagging experiment. We taped a piece of paper around the handle bars or bicycle brakes of the bicycles. The papers read "This paper is part of a bicycle parking project, please throw away when removed. Thank you!" in both English and Danish. The amount of bicycles and the amount of spots blocked by these tagged bikes were counted every Tuesday and Friday for 23 days. This exact process was also done on the neighboring street of Vestergade to compare results within the city.

Objective 2: Identify the Needs Of All Stakeholders:

- We certainly divided all of stakeholders into three different groups which include cyclists, shop-owners and pedestrians.
- We approached the cyclists and the shop-owners with semi-structured interviews
- For the pedestrians we observed their different behaviors according to congested poor bike parking and how it affected them.

Objective 3: Propose Final Bicycle Parking Recommendations

- Goal of this objective is to bring together the quantitative data of objective 1 with the qualitative responses of objective 2, into one final set of recommendations
- To do this, we decided to quantify all of the criteria for the potential solutions that we had found by weighting them all on a scale of 1-5 for importance, 5 being the highest
- A Pugh Matrix would best accomplish this goal, which will be explained in the results slide

Results: Assess the Current Habits of Cyclists: Demographic Trends:

- As Jessie said previously we came up to three different demographic categories that are these ones shown.
- The main cyclists parking on Studiestraede are young men and women riding regular bicycles.
- They are parking poorly

Results: Assess the Current Habits of Cyclists: Flow Data:

- Flow data gained from continuously counting bikes entering and leaving the street
- Flow magnitude is the absolute value of bikes entering and leaving for an hour, so 20 bikes leaving and 20 entering that hour is a flow magnitude of 40
- To display results of this data, we plotted time on the x axis and total bikes over flow magnitude on the y axis in order to display trends
- These results are important to know when maximum levels of parking are required, what those maximum levels are, and then also specific time windows that extra

accommodations could be required, such as time that flex parking would need to be used for bike parking

- Weekdays: peaks at midday, as expected due to people being out getting lunch and having leisure time, lulls in the evening
- Weekends: peaks at evening, when people go out for social activities, lulls at midday

Results: Assess the Current Habits of Cyclists: Hourly Observation:

- The Major finding from our hourly observations was how far the bicycles extended from the racks and into the streets. The above graph shows how far bicycles extended out of the stand and into the designated car parking for given times of day with the y axis representing how far the bicycles extended in meters and the x axis representing the time of day. The red line represents the weekdays and the blue represents the weekends. One the weekdays these bicycles extend on average 9.54 meters and on weekends they extend 12.1 meters. This gives an average of 10.83 meters for any given day on Studiestræde.

Results: Assess the Current Habits of Cyclists: Tagging Experiment:

1. Studiestraede

- This graph represents the number of tagged bike still on the street after so many days
- After 3 weeks, 52 tagged bicycles still remained. These 52 dead bicycles block 30 out of the 81 bicycle spots along the street.
- It is important to note that during our counting we found that less tagged bicycles blocked more bicycle parking spots. This is due to the tagged bicycles having a greater chance of being knocked over the longer they are left

2. Vestergade

- The same experiment was conducted on Vestergade.
- Vestergade has 5 bicycle racks vs. studiestraedes 3 racks
- After 2 weeks 50 tagged bicycles remained and these 50 tagged bicycles blocked 33% of the 134 available parking spots

Results: Identify the Needs of all Stakeholders. Cyclists

- We interviewed a total of 30 cyclists on Studiestræde. Of these cyclists 22 or 75 % report being frustrated with the current parking solution due to it being difficult to find parking in the overcrowded racks. We also asked cyclists if they had ever parked over night or longer in a public rack. 7 cyclists said that they've ever parked over night or longer in public racks. However, all of these cyclists admitted to doing so at metro or train stations, which did not provide any further insight into where the previously mentioned abandoned bicycles on Studiestræde come from.

Results: Identify the Needs of all Stakeholders. Shopowners

- Of the shopowners and employees we were able to interview we found that 75% held a negative opinion toward bike parking on studiestraede
- 56% actually move bicycles that block their entrance and or view of their shop
- When asked about their opinions of potential solutions, out of the 8 shop owners who responded, 7 supported the idea of additional bicycle racks. However, no shop owner volunteered to have the new racks placed in front of their store

Results: Identify the Needs of all Stakeholders. Pedestrians

- Pedestrian's results come to be observational based on counting their behavior for 4 consecutive hours in the street.
- On average of both days 405 pedestrians walked on the street per hour
- Their behaviors differed on the different peaks of poor bike parking congesting the sidewalks for people to walk.
- On average: 11.5% of these people were forced to step on the street due to lack of space or had to change sidewalk.
- Or even just start walking on the street.
- As consequence poor bike parking causes pedestrians to struggle their daily walks on sidewalks and may cause accidents due to invading bicycles and car spaces.

Results: Propose Final Recommendations. Pugh Matrix

- In the Final Pugh Matrix, we graded out the potential solutions of improving the bicycle removal system, adding flex parking, adding additional bicycle racks, posting informative signs, and starting a large scale campaign to increase proper bike parking awareness in Copenhagen
- They were evaluated based on the criteria in the left most column, and given a weighted value from 1-5 based on the importance
- Each recommendation was then evaluated for if it improves on each specific criteria, falls short on it, or has no significant change, with a +/-0 scale
- Totals for scores could be found in the bottom row, with a specific breakdown for each option being found in the results section of the report

Recommendations

- We are presenting these three recommendations as part of our powerpoint
- Flex parking
- Additional Racks
- Improved Bicycle Removal System

Recommendation 1+2: Conversion of Car Parking to Bicycle Parking

- Our first two recommendations, flex parking and the addition of new bicycle racks require the conversion of car parking into bicycle parking. This conversion usually comes at a cost as the government receives revenue from car parking, especially on Studiestræde which is located in the red zone, the most expensive area of the city to park. However, as previously mentioned the bicycles on Studiestræde are already extending into and taking up an average of 10.83 meters each day. The average length of a car parking spot is 4.80 meters meaning that the bicycles on Studiestræde are taking up 2.25 car parking spaces. If these car parking spaces are already being used by bicycles, and the city isn't receiving the revenue from the parking space, the conversion shouldn't come at much of a cost.

Recommendation 1: Flex Parking

- Flex parking is shared parking among cyclists and motorists. We believe that flex parking may be a potential solution to the current bicycle parking situation on Studiestræde because there are peak hours during the day when bicycle parking as well as the extension

of bicycles into designated car parking spaces are at a peak. On weekdays this peak occurs between 10:00 and 18:00. Flex parking is also a viable option because while it takes away car parking during the peak bicycle parking hours, the government will still be able to receive revenue from car parking during the other hours of the day.

Recommendation 2: Additional Bicycle Racks

1. Current Bicycle Racks

- We came to have 2 possible bike parking rack design.
- First design ideas is to keep the very simple hoop design located on studiestraede.
- 8 bicycle spots in this design can fit within one car parking spot
- We would recommend adding an additional 32 bicycle spots on the street to accommodate the overflow of parked bicycles however only 20 would fit in the 10.83 meter already taken up by extended bicycles

2. Varsity Bicycle Docks

- Cost and safe efficient
- It fits 11 bicycles per a car parking spot and can be located perpendicular, parallel or diagonal to each other depending on the location.
- Wheel fits into a rounded platform that prevents the bicycles on falling.
- Space for customization.
- Cyclists demand for bike racks that offer locks to improve safety and this exactly what these docks have.

Recommendation 3: Improved Bicycle Removal System

- Two employees work on marking and collecting abandoned bikes throughout entire city
- Law allows bicycles to be removed 1 month after being tagged
- Ideally each street can be cleaned of abandoned bikes each month (12 times a year)
- In reality Studiestraede only clean 3 times in 2015
- A second fall back is only bicycles that look abandoned are actually tagged
- This is why in 2015 only 25 bicycles were removed from Studiestraede
- Yet in our personal experiment we found 52 abandoned bicycles in only 3 weeks
- Many abandoned bicycles are not even getting tagged in current system
- Estimated 35,000 abandoned bicycles on public areas in entire city
- Bicycle removal costs 1-10 of the cost of additional bicycle racks

Recommendation 3: Improved Bicycle Removal System

- Improved system needs
- Clarification of Laws
 - a. Define what happens to illegally parked bicycles
 - b. As shown in the picture a sign that clearly says no bike parking was put up and someone still parked right beneath the sign due to no consequences
 - c. Define who can move illegally parked bikes, where they go, and how cyclists can get them back... do they have to pay a fine
- Improve efficiency of the marking and collecting aspect
 - a. The workers who tag and mark bikes do not visit the racks everyday so they do not notice which bikes have been in the rack for a long period of time

- b. Have volunteers or shop owners who visit and see the racks everyday record on a app or website the bikes that have been parked for a long period of time (over 5 days)
- c. Tracking system built into parking facilities
- d. More employees

Recommendation 3: Autocad Model

- To give you a visual of what an improved removal system would look like we created a 3D model on Autocad
- 1. First picture
 - Zone 3 currently. Notice that the rack is overcrowded forcing cyclists to park against the wall or into car parking spaces
- 2. Second Picture
 - Zone 3 after tagged bicycles are removed. Space freed up in racks