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bike infrastructures

contents

1.0 introduction

Decisions on transportation projects are typically based on the potential for the project to contribute to broad public policy goals. Danish urban design solutions and urban policies effort aim to increase bike-ability. To make the best use of transportation funds there is a critical need for better information about two important considerations relating to bicycle infrastructure: the cost of different bicycle infrastructures and the effects of such investments have on bicycle use, which includes the resulting environmental, economic, public health, and social benefits. Therefore, information on how determined bicycle infrastructure enhances cycling will help decision makers to develop better design solutions.

This research project picks up from this conclusion and focuses on the possible effects of changes to the cycling infrastructure, investigating and analyzing cycling motivation related to distinct bike infrastructure typology characteristics.

This research aims to identify bicycle infrastructure typologies and design elements that can help promote cycling significantly. The study was structured as a study case based research where there were three cycling infrastructures with distinct typologies – Vestergade Vest in Odense (shared-use space in the core of the city); Hans Borges Gade in Aarhus (an extension of a bicycle route linking the suburb to Aarhus Central station) and Bryggebro in Copenhagen (a bridge for cyclists and pedestrians crossing the harbor) – were analyzed and compared.

In order to achieve this goal, the study got a more detailed insight in what design characteristics are relevant for cyclists when riding a bike and how cyclists do evaluate a cycling infrastructure based on these characteristics.

To achieve this goal, this report is organized as follows. First, there is a debate in regards to the main concepts and notions used in this research. In section 2, the research method is explained. This section is followed by a description of the research sample. In section 3, the analysis of each of the three cases is presented. A comparative analysis between the three cases is described in section 4. Finally, the report ends with conclusions and suggestions for future research and also for urban designers, planner and engineers.

The achieved knowledge will be used to contribute to more efficient and qualified urban planning and management – promoting a better quality bike-ability of urban structures as possible and assess potential effect of investments in bicycle infrastructure.

Therefore, this research project will inform urban designers and planners in the context of Danish municipalities by identifying opportunities and barriers for cycling in the physical environment. Bridging research and policy, the findings of this research project can also support bike friendly design and planning, and cyclist advocacy.

Figure 1.1: Cyclist riding his bike at Bryggebro.

2.0 methodology

The report presents a methodology and tools for mapping and evaluating the potential benefits of the implementation of bicycle infrastructure. The results will help to better understand what characteristics from a bicycle infrastructure are relevant to enhance cycling. Consequently, the findings will also help urban designers and planners to develop more effective bicycle infrastructures.

There is also an effort to better understand how relevant socio-demographic variables are in relation to the individuals` perception of bicycle infrastructures and to possible influential design characteristics on the decision to ride a bike.

Through ex-post studies of three bicycle infrastructures with distinct typologies, this research aims to identify design characteristics that can enhance cycling. The studies are based on the impact of the bicycle infrastructures on cyclists` travel behavior and the cyclists` views upon the design characteristics of the infrastructures.

Moreover, the report has a brief description of the implementation process of the selected bicycle infrastructures and the local government context that regards cycling network and campaigns.

THE CASE STUDIES AND SELECTION CRITERIA

First of all, it is relevant to mention that this research does not intent to represent an exhaustive analysis of all typologies of infrastructure and neither all new infrastructures implemented in Danish cities in the last 5 years.

While some critical analysis was done to select the particular three case studies analyzed in this report, their inclusion depended to a great extent on three criteria: recently implemented infrastructures (less than 5 years); distinct typologies between the cases; and located in municipalities which were interested and willing to share detailed information about the interventions.

The infrastructure should be less than 5 years old, presenting a reasonable time to individuals that ride their bicycles there to remember their travel habits before and after the intervention.

Three interventions with distinct typologies were subjected to ex-post studies: Vestergade Vest and Mageløs in Odense (shared-use space in the core of the city); Hans Broges Gade in Aarhus (improvement of a section of an existing bicycle corridor that links the suburbs to the core of the city) and Bryggebro in Copenhagen (a bridge for cyclists and pedestrians crossing the harbor).

Figure 2.1: Location of the cities from the three case studies

DATA COLLECTION AND ANALYSIS

The project applies a multi-disciplinary approach to research on bicycle infrastructure, correlating quantitative determinants and qualitative knowledge types.

Both primary and secondary data have been employed. For each infrastructure, the data was collected through a questionnaire based on a web survey, counting of cyclists, local observation, diary of the daily flow and atmosphere and image collection, interviews and exchange of e-mails with key actors, review of reports, official documents, newspaper articles and press releases.

According to Denzin (1978), a triangulation method can be defined as "the combination of methodologies in the study of the same phenomenon". Considering the geometric characteristics of a triangle, it can be assumed that distinct viewpoints allow for greater accuracy.

BICYCLE COUNT

The bicycle count is a strategic tool to better understand how changes in an infrastructure either encouraged or discouraged cycling. The bicycle count from Hans Broges Gade and Bryggebro was provided by respectively Aarhus municipality and Copenhagen Municipality.

In the case of Vestergade Vest and Mageløs, a manual count was done on the Tuesday the 12th of September 2010. The manual count is defined as a count where one or more data collectors register the volume of traffic (Vejdirektoratet, 2004).

The data collectors used counting boards with manual click counters fitted to them and they recorded their counts on a paper sheet at the counting board after each thirty minute periods. In addition, the counting sheet also included the following information: date, day of the week, weather condition and data collector`s name.

The count can be conducted manually or with automatic count technologies; having both advantages and disadvantages. Because the counts were done manually, it was possible to have two categories – cyclists riding a bike and cyclists walking and pushing their bikes.

The data collected was the number of cyclists riding a bike and cyclists walking with their bikes in each direction on the midpoint of Vestergade Vest and Mageløs. The counts were done by a team of three field data collectors. There was always one data collector for each direction at the counting point from 7am until 7 pm. A third counter functioned as a backup, making possible for every data collector have a break every hour.

The count was taken over a 12-hour period between 7 a.m. and 7 p.m on a Wednesday of September. And following the recommendations of the Vejdirektoratet (2004), the data collectors that developed the counting were placed in a spot that did not interfere with the traffic flow. In order to minimize the chance of external interferences – weather, sport events, manifestations – in the data collected, the date of the counting was carefully picked.

The Vejdirektoratet (2004) suggests that the count should be taken on Tuesday, Wednesday or Thursday in September. Due to their sporadic travel patterns, Monday and Friday should be avoided for not being representative of a typical weekday.

In parallel of the count activity, a diary was written describing the different flow patterns, speed and atmosphere of the infrastructures throughout the day.

DATA ANALYSIS

After the data collection, an ex-post analysis of the counting figures was implemented. Moreover, it developed a relation between the count figures and the diary with the description of the different flow patterns, speed and atmosphere of the infrastructures throughout the day.

The data was compiled and displayed on graphs to make comparisons that are useful for analytical purposes. A graph with the results was also used to develop a comparison with the diary of the infrastructure and images taken during the day.

AN ANALYSIS OF BIKE INFRASTRUCTURE PERFORMANCE THROUGH THE LENSES OF CYCLISTS

The bicycle is an important and strategic means of transport in urban areas. In Danish cities, the traffic system already offers a large amount of bicycle infrastructures – e.g. bicycle lanes with special pavement, bicycle tracks, green corridors, shared spaces – and cycling policies, campaigns and cyclist friendly traffic regulations.

In this context, it emerges a need to measure the impact on travel behavior of the new bicycle infrastructures implemented in urban areas. Having three case studies, this report expands on how these assessments can be done. The web based survey was conducted aiming to define how much the implementation of the bicycle infrastructure had enhanced cycling, to identify influential design factors in the decision to cycling and to assess the bicycle infrastructure through the lengths of the cyclists.

In order to analyze bicycle infrastructures through the lengths of cyclists, the web survey targeted the cyclists as potential respondents. The web survey involved designing a questionnaire to find out the cyclists perception of cycling infrastructures and what characteristics of these infrastructures have encouraged or discouraged cycling.

Relevant questions in the context of cyclists perception and evaluation of cycling infrastructure are ‘what design characteristics do cyclists mostly observe/perceive while they are using the cycling infrastructure?’ and ‘how do cy-

clists evaluate these design characteristics?'.

However, there are several studies focusing in the cyclists perception of the physical environment where they are travelling through and most of them conclude that cyclists have a small knowledge of the physical environment their used to travelling through (Bovy et al, 1990; Landis et al, 1997; Noël et al, 2003).

Despite this small knowledge cyclists have, it is important both to identify which design characteristics from a bicycle infrastructure are relevant for them when they are riding a bicycle and to develop an assessment of a cycling infrastructure based on the cyclists perspective.

Taking in consideration social demographic characteristics – gender, age and educational level – the study also aims to better understand how relevant socio-demographic variables are in relation to the individuals` perception of cycling infrastructures and to possible influential characteristics on the decision to ride a bike.

WEB SURVEY

There is an increasing number of web-based surveys, being important to highlight the specific design characteristics of this tool. Manfeda et al. (2002) comments that "Since there is no help from an interviewer for the respondent taking a Web survey, the design of self-administered Web questionnaires is even more important in order to achieve high data quality. Question wording, form and graphic layout of the questionnaire are particularly important."

The web survey has a great advantage to get the data already in an electronic format and the electronic format can also eliminate data entry errors. Moreover, the web survey made it possible to do a non stop flow of cyclists in the studied infrastructures. Through the distribution of web-cards, we have achieved our target group and, at the same time, we did not disturb their routine.

Through comparative studies between responses rate of web surveys to other survey modes, Lozar (2001) highlights that web surveys usually obtain lower response rates. Complementing, Gonzalez-Bañales and Adam (2007) indicates that response rate for web surveys is around 10% or lower.

In order to optimize the number of respondents, complex questions should be avoided and the web survey should only be closed after six weeks from the distribution of the web card. (Gonzalez-Bañales and Adam, 2007)

The web survey design, implementation and analysis were divided in five phases: planning the survey; writing the questionnaire; designing the web questionnaire and web cards; distributing the web cards; and data treatment and analysis.

It should be considered that of the studied population could be unwilling to devote much time to a web survey. In order to optimize the response rates and the number of completions, it was needed to make the survey as short as possible but still enabling to gather all the relevant information.

The use of incentives can additionally contribute to attract respondents. As a strategy to attract more respondents, a lottery having a bicycle – with the value of 3500DKK – as price is presented in the web cards and web page. All the respondents participated in the lottery.

At the web page, there was an image of the cycling infrastructure being analyzed by the respondents and the logo from Aalborg University. Moreover, it provided information about the research project and goals, contact for further inquiries, information about the lottery and an explanation about the privacy policy in regards to the respondents.

QUESTIONNAIRE

The questionnaire was designed aiming to find the demographic profile of the cyclists, the relevant design characteristics for the cyclists and which extended the implementation of the infrastructure enhancing cycling. Cyclists were asked to indicate which cycling infrastructure characteristics they had observed during their trip. They were also asked to evaluate the observed cycle infrastructure characteristics. In addition, respondents were invited to make comments about the infrastructure (see model of the questionaire on page 198).

In order to develop the survey – especially the questionnaire – journal articles and research reports in the area of urban cycling studies were reviewed to identify consistent infrastructure characteristics that could enhance cycling – e.g. safety, aesthetics, accessibility, fast connectivity (Pikora, T. et al, 2003; Kweon, B.S. et al, 2004). At the end of the questionnaire, there was a space for general comments.

Figure 2.2: Screen print view from the Vestergade Vest`s questionnaire.

FLYER DISTRIBUTION

For every studied infrastructure, the distribution of the flyers occurred from 7am until 7 pm in one weekday (Tuesday, Wednesday or Thursday) with good weather conditions (no rain or heavy wind) in the month of September. From 7am until 7pm, web cards were offered to every cyclist riding a bicycle in the infrastructure in both directions. The flyers were distributed on the same day of the count survey. For each of the cases, the web survey was available from the date of the web card distribution until four weeks later (see model of the flyer on page 197).

	Vestergade Vest and Mageløs	Hans Broges Gade	Bryggebro
Flyers distribution & web survey opening	September 14/Tuesday	September 2/Thursday	September 1/Wednesday
Web survey closing	October 12	October 1	September 30

Table 2.1: Date of flyers distribution, web survey opening and web survey closing for the three case studies.

Figure 2.3: Flyer distributed to individuals riding a bike at Vestergade Vest and Mageløs on the 2nd of September 2010.

PILOT WEB SURVEY

A pilot web survey was carried out under the same conditions than the real survey. The pilot web survey was held in the street named Vesterbro (Aalborg) in August of 2010. The pilot web survey functioned as a review of the questionnaire and the associated data collection methodology. After the pilot web survey, the necessary modifications in the questionnaire were made accordingly.

THE STUDIED POPULATION AND SAMPLE SIZE

Respondents of the survey are cyclists that have at least once ride a bicycle in the studied infrastructure.
Despite of the consideration that part of the studied population would be unable to access the Internet, the Internet users are becoming more and more similar to the general population because of the accelerated increase in internet usage (Pastore, 2001).

	Vestergade Vest and Mageløs	Hans B. Gade	Bryggebro
Total no bicycle trips/ day	6446	1251	7352
Estimated nº bicyclists/ day (65% of total)	4189	813	4778
Flyers handed	1328	605	3020
Respondents	298	163	290

Table 2.2: Number of bike trips, cyclists, flyers handed out and a number of respondents for the three case studies.

DATA ANALYSIS

The data analysis aimed to better understand the impact of the examined infrastructures in the bicycling activity. The data collected was examined and uncover relationships among the data were highlighted.
Data collected from the questionnaires were entered into the statistical software Statistical Package for Social Science (SPSS) for analysis and then statistical tests were applied to identify describe the results and level of dependency between variables.
Table and graphics are also used for displaying the data in a variety of formats in order to identify patterns and differences among the results set.
The collected data from the web survey was analyzed in the four different stages and using a distinct statistical treatment.
Firstly, the residential location of the respondents was spatially identified and then analyzed in relation to the distance to the infrastructure. In a second stage, Descriptive statistics were applied to describe collected data and highlight singular characteristics and relevant patterns. Socio-demographic patterns of the respondents were identified and the distribution of the answers was described with patterns.
Finally, the Chi2 test was applied to identify possible relations between socio-demographics (independent variables) and the variables originated from the web survey questions (dependable variables). Considering the nature of the studied variables – the majority of them are nominal – the Chi2 test was selected to this analysis.

INTERVIEW AND ELETRONIC CORRESPONDENCE WITH KEY ACTORS

Through non-structured interviews and electronic correspondence, personal opinion and information about the studied infrastructures were also gathered from both technicians from the studies municipalities and cyclists.

DATA ANALYSIS

A data basis was developed in the Excel with all the interviews and questionnaires. This data base identifies relevant information to be used in the report. The interviews and electronic correspondence functioned as support information to the count figures and web survey findings.

FIELD OBSERVATIONAL SURVEY AND IMAGE COLLECTION

Observation is a major source in the field research, the three infrastructures were analyzed in loco, local conditions during the day were observed and a diary was writing. The observation aimed to identify possible design characteristics of the infrastructures that may affect people's traveling behavior.

The design detail characteristics analyzed in loco were: infrastructure typology, pavement material and lay out, on-street parking facilities, priority signs at crossings, hierarchy of the modes of transport (pedestrians, cyclists, car drivers), traffic calming solutions, public art, signage, greenery, lightning (day and night) bicycle paths and lanes.

DATA ANALYSIS

An image data base was implemented and the material was used in several sections of the report to visually exemplify findings. Moreover, images took from the site were used to compare with the counting and illustrate the local conditions throughout the day.

The descriptions from the diary were also a strategic data used to be compared with the count figures and the web survey findings.

Figure 2.4: Member of the research team delivering flyers to cyclists at Vestergade Vest and Mageløs on September 14th 2010.

3.0 cases

ODENSE

SHARED SPACE

VESTERGADE VEST AND MAGELØS

AARHUS

BICYCLE TRACK

HANS BROGES GA

ADE

COPENHAGEN

BICYCLE BRIDGE

BRYGGEBRO

3.1 case1
shared space vestergade vest and mageløs

3.1.1 ODENSE

Odense is the third largest Danish municipality and has a population of 188777 inhabitants in 2010 (Statistikbanken, 2010). The municipality is located in the island of Funen and it is part of the South Denmark Region.

Figure 3.1.1: Geographical location of Odense.

MUNICIPALITY VISION

In December 1993, the Danish government presented a strategic plan for sustainable transportation – named Traffic 2005 – aiming to create a balance between economic development and environment based on principles of sustainable growth. One of the main objectives was to increase the share of cyclists in overall individual transportation in the country until 2005 (Trafikministeriet, 2000)

In order to achieve this objective, 4% of individual transportation should be moved from private automobile to bicycle or walking. In practice, it means that all trips shorter than three kilometres should start to be made by private motorized vehicles to healthier and environmentally friendly modes – cycling and walking.

In that context, Odense was selected to function as a lab for new solutions and became the National Bike City and it was name “Odense Bike City”. The main goal was to increase 2% of trips made by bike in the period from 1999 until 2002.

The Danish Ministry of Traffic and the Danish Road Directorate financially supported Odense with ten million Danish krones to implement solutions aiming to enhance cycling. The Odense counterpart was ten million Danish krones. A broad range of projects were implemented, ranging from campaign activities to physical interventions in the built environment.

In 2002, the Odense municipality achieved the projects main goal, increasing more than 2% the share of cyclists in comparison with figures from 1999. In 2008, Odense municipality decided to revitalize its policies towards cycling and started to promote itself as the Cyclists` City and presented this vision for its own future:
“Odense must be a city where cyclists have the best conditions because Odense makes the experience of cycling easier, safer, more comfortable and more exciting” (Odense Municipality, 2010f).

Currently, 25% of all commuting trips – to work or study – are made cycling in Odense (Odense Municipality, 2010d). The goal within the vision is to increase the amount of trips on bike 25% in 2012 to have reached a total increase of 35% in 2020 in relation to the 2007 numbers. Further 10% more cyclists should feel safe in traffic (Odense Municipality, 2010c).

According to Figure 3.2, 25% of the trips made in Odense have a bike as a transportation mode. The amount of bike trips peeked with 27% of the total in 2000 – during the period of the National Cyclists City policies – and then went down to 24% in 2006. In 2008, the starting year of its new vision as the Cyclists’ City, the amount was 25%. Therefore, Odense municipalitys goal is to achieve a ratio of 32,5% of bike trips from the overall traffic count.

Currently, all the cyclist related campaigns from Odense municipality are organized under the umbrella of the vision named Cyklisternes By – or Cyclists` city. The decision to change the title of its vision from “Odense Bicycle City” to “Odense Cyclists` City” was based on the intention of change the focus from the bikes towards their cyclists.

A webpage has been launched for the new branding with news, information, cyclist maps etc. The Odense Cyclists` city campaign also has a weekly column in the local newspaper – Fyens Stiftstidende – every Thursday since July 2010 (Odense municipality, 2010g).

In the international level, Odense municipality has built its own stand on the 2010 Shanghai Expo where there the image of city is represented by both its bike infrastructure and cyclists and the fellow-townsman Hans Christiansen Andersen (Odense Municipality, 2010h).

According to the interview with Dorthe Råby and Rune Bugge Jensen, one of the challenges that Odense municipality faces is to convince commuters living 5 kilometres away from the core of the city to use their bikes as main transportation mode to go work or study. Tackling this challenge, Odense Municipality has launched a campaign in the spring 2010 where it lent 100 electric bikes during a period of six months to car users living more than 5 kilometres away from the centre. A new round of the campaign started in autumn 2010.

Another strategic action towards enhancing cycling was to implement monitors in the main bike infrastructures of the municipality counting and displaying the amount of cyclists riding their bikes per day and per year (Odense municipality, 2010e).

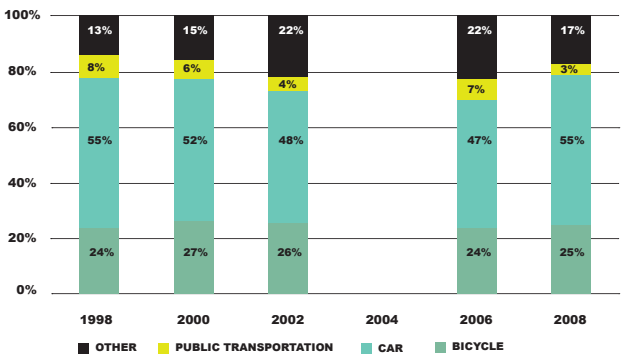

Figure 3.1.2: Distribution of the trips by transport modes within Odense Municipality from 1998 until 2008. Source: Danmarks Statistik.

BICYCLE NETWORK

The majority of the streets in Odense are bike friendly and bikes have the same hierarchy than motorized vehicles. Moreover, Odense municipality has a total of 510 kilometres of bicycle tracks and lanes (Odense municipality, 2010a).

In comparison to Copenhagen municipality, Odense municipality has approximately 110 kilometres more of bike tracks and lanes. It means that Odense municipality has 2,7 metres per inhabitant of bike lanes and tracks, while Copenhagen municipality has 0,77 metres of cycle track per Inhabitant. (Statistikbanken, 2010).

Figure 3.1.3: Map of the main bike tracks and lanes in Odense`s inner city.
Source: Odense Municipality.

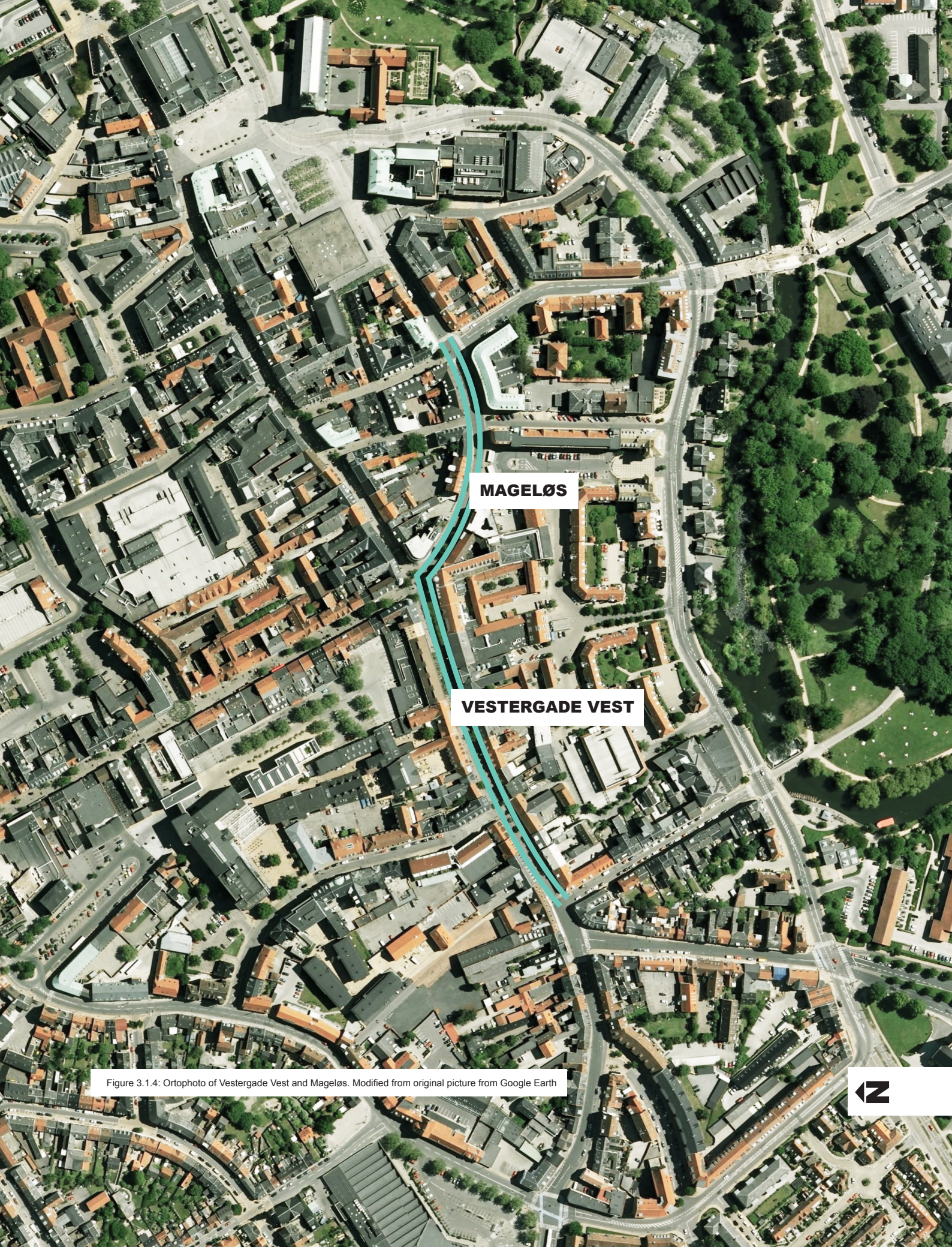

Figure 3.1.4: Ortophoto of Vestergade Vest and Mageløs. Modified from original picture from Google Earth

3.1.2 VESTERGADE VEST AND MAGELØS

The intervention in Vestergade Vest and Mageløs was completed on the 19th of August 2010. The former crowded street by motorized vehicles was transformed in a shared-used space for pedestrians, cyclists and a future central electrical bus ring – being allowed the access for cargo-carrying motorized vehicles. All the buses were re-routed to parallel streets nearby. (Odense municipality, 2009i).

The transformation of Vestergade-Vest and Mageløs is part of an overall plan to improve quality of urban life within the core of Odense described in the Traffic and Mobility Plan 2008 (Odense municipality, 2009i).

A study conducted from Gehl Architects indicated that the amount of pedestrians in the core of the city was decreasing. One of the pointed reasons is the increasing competition between street based retail and large commercial centres located in the outskirts of Odense – for example the shopping centre named Rosengårdscenteret that has a 100.000 m2 of stores.

In that context, the municipality has been implementing several physical interventions towards a more lively urban core in the near. According to the interview with Dorthe Råby and Rune Bugge Jensen, one of the main targets of these interventions is the improvement to the quality of the experience of walking and cycling.

On the first of August 2010, Vestergade Vest and Mageløs were closed for motorized vehicles traffic and the urban transformation began. The approach to change the street was done in a rather untraditional way. Due to low budget, it was decided to try to change the street through minimal interventions with temporary elements that would be easy to rearrange things that did not work out properly.

The Vestergade Vest and Mageløs can be seen as a lab where temporary interventions were made in order to understand how the population would react to new experiences and the public space. The pavements and levels of the former street were kept and elements were inserted in the streetscape to indicate pedestrian only paths along facades and shared space in the middle of the road.

The new layout promotes walking, cycling, shopping, playing and eating. It also offers the opportunity to promote products outside shops and to have outdoor seating for cafes and restaurants.

During the first 14 days after the street was closed for for vehicles, several elements were inserted in the streetscape – plastic guiding markers, bicycle parking racks, ping pong tables, etc – and then Vestergade Vest and Mageløs started to look more like flexible and informal space and open for different experiences.

The former car lane and sidewalk pavements were kept. During the 14 days intervention, several drawings were made in the pavements. These drawings have diverse functions where some of them indicate the beginning of the shared-user space and others have a more playful purpose.

The entire urban transformation took only 14 days and the official opening was on the 14th of August 2010. But the project is not finalized yet and the intention is exactly that: to be a designing in process space. More elements will be added over time as well as evaluations of the space might change the layout over time.

The intervention made possible to implement new changes with a low cost. After the first month, the technicians from the municipality had feedback from users – pedestrians, cyclists, shopkeepers, people dining, etc – and then rearrangements were made with the mobile equipments and plastic markers were relocated.

Rune Bugge Jensen – landscape architect from Odense Municipality and responsible for the design solution at Vestergade Vest and Mageløs – has emphasized how important is to improve urban life experience in the core of Odense. In regards the intervention at Vestergade Vest and Mageløs, he mentioned

“I wanted to push the limits from what experiences people have in the public space and I also wanted to make them start to question and reflect for what a public space could be used for… It has been very provocative to put ping pong tables on the former motorized vehicle lanes… It has been a challenge to reinvent the former motorized vehicle lanes into a space for urban life, play and exercise” (interview with Rune Bugge Jensen, 2th of September, 2010).

Since the opening of the new shared-use space, there has been quite some media attention on the street. On the 13th of September, the local newspaper – Fyens Stiftstidende – wrote an article with the headline “Chaos plagues the new pedestrian street” (Fyens Stiftstidende, 2010b).

And on the 15th of September, the main editor of the Fyens Stiftstidende wrote “Bicycles must be out of pedestrian streets” (Fyens Stiftstidende, 2010c). Both articles were questioning if it is possible to have a schared-use space environment for pedestrians and cyclists.

2 FyensStiftstidende

Odense

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Spidsen

Cyklerne skal ud af gågaden

I en gågade bør fodgængere ikke befinde sig i konstant fare for at blive kørt ned af en cyklist i fuld fart.

Det er desværre tilfældet i den nye kombinerede gå/cykelgade i den vestlige del af Vestergade, som 1. august blev lukket for bustrafik og overladt til de bløde trafikanter.

I gårsdagens avis stod flere af de handlende i gaden frem og sagde det, som det er: At den kombinerede gå- og cykelgade simpelthen ikke fungerer efter hensigten.

Odense Kommune bør lytte. Hurtigst muligt, inden uopmærksomme børn, svagtgående ældre, shoppere og alt for mange andre kommer til skade, når gående og cyklister er på direkte konfrontationskurs, som det mange gange dagligt er tilfældet.

Problemet er lige nu, at cyklisterne kun har et dårligt alternativ til Vestergade Vest. Så skal de tohjulede køre ad Filosofgangen, og vejen er smal og ikke egnet til store mængder cykeltrafik side om side med den tætte biltrafik.

Løsningen er den, som Odense Kommune selv peger på. Nemlig at der skal bygges en cykelsti langs Filosofgangen, så cyklisterne får et brugbart og sikkert alternativ til at køre ad den nye gågadestrækning i Vestergade.

Ærligt talt, så burde cykelstien have været bygget, inden omdannelsen af Vestergades vestlige del til gågade. Planerne om at udvide gågadenettet med den strækning har eksisteret i årevis, og i det lys må det tilskrives dårlig planlægning, at der ikke er fundet en løsning på cykelproblemet på forhånd. En god plan havde sikret, at en ny cykelsti på Filosofgangen kunne åbne samme dag som den nye gågade.

Af Esben Seerup
Odenseredaktør

Omdannelsen af den vestlige del af Vestergade til gågade er rigtig for Odense. Allerede nu, blot halvanden måned efter busserne forsvandt, er der liv i gaden som aldrig før, og byens centrum har fået en pift på den gode måde.

Men kravet om, at cyklerne skal ud af gågaden og ned på en ny cykelsti på Filosofgangen, er forståeligt.

Er det manglende bevillinger, der er årsagen til, at der endnu ikke er bygget en cykelsti på Filosofgangen, så må politikerne træde i karakter og få prioriteret opgaven. Nu. For det haster.

”Løsningen er den, som Odense Kommune selv peger på. Nemlig at der skal bygges en cykelsti langs Filosofgangen, så cyklisterne får et brugbart og sikkert alternativ til at køre ad den nye gågadestrækning i Vestergade.

Badmintonspilleren Viktor Axelsen, der er U19-verdens

Man er n… presse cit…

Det er nødvendigt med eliteidrætsklasser, mener Årets Fund på Fyn, Viktor Axelsen

Det ærgrer Viktor Ax… der er ungdomsverden… ster i badminton og gå… teidrætsklassen i 10. kla… Hjalleseskolen.

- Jeg synes, det er … lig trist, hvis det skulle… ulovligt at køre skolen. Danmark fortsat skal … topidrætsfolk, er man … udøver nødt til at pres… tronen og forfølge sin … fuldstændigt. Så det e… fedt, hvis det stopper, Viktor Axelsen, der … badminton i OBK og bl… ret til Årets Fund 2009.

Nyt håb for eliteklasser
Forsiden af dagens sektion

Odense: Hjalleseskolen har gennem flere år arbejdet med eliteidrætsklasser, hvor unge, talentfulde sportsfolk har kombineret skolegangen med deres topsport.

Statsforvaltningen Syddanmark har nu afgjort, at det er forbudt at optage elever efter særlige sportslige kvalifikationer, og dermed kan det være slut med eliteidrætsklasser i …

Viktor har rykket sig

Han er en af flere sports… der har fået hjælp af Hja… skolen i sin vej mod top…

Figure 3.1.5: Article with the title “Bicycles must be out of pedestrian streets”, published on 15th of September in the newspaper Fyens Stiftstidende (Fyens Stiftstidende, 2010c).

Mandag 13. september 2010

Odense | Fyn

FyensStiftstidende | 2. sektion

Assens: Hvæs, og spænding ved Mis Vissenbjerg
SIDE 18

Kaos plager ny gågade

Cyklister, knallerter, fodgængere og bordtennisspillere er for meget på samme gade, lyder kritikken

Odense: Der hersker trafikalt kaos på den nye gågadestrækning i Vestergade Vest, der, siden busserne blev fjernet 1. august, har fungeret som kombineret gå- og cykelgade.

- Situationen er katastrofal. Folk ved ikke, hvad de må og ikke må, siger Eddie Mahatti, indehaver af Café Cacoon' Nest.

Fra flere andre forretninger lyder de samme toner, og det er især de ældre regler for, hvordan cyklister og fodgængere skal færdes sammen på gaden, der skaber de kaotiske scener, lyder kritikken.

- Helt generelt kan vi se, at folk har rigtig svært ved at finde ud af, hvor man må cykle, og hvor man må gå. Det kan godt give nogle farlige situationer, siger butikschef i Inspiration, Margit Brunse.

Et andet problem er knallerter, som ser stort på, at de slet ikke må køre i gågaden.

- De forbandede knallerter skulle skydes og køres langt væk, lyder det fra Jørgen Findsen fra Findsens Herretøj. Han tilføjer:

- De er totalt ligeglade.

Hos Odense Kommune erkender projektleder Rune Buggie Jensen, at der er problemer. Fornager vil løbende blive justeret, pointerer han.

Af Rune K. Blichfeldt
rkb@fyens.dk

Slåsgrendestart side 4-5

Middelfart side 22

Naturen serveret

Figure 3.1.6: Article with the title “Chaos in the pedestrian streets”, published on 15th of September in the newspaper Fyens Stiftstidende (Fyens Stiftstidende, 2010b).

BEFORE AND AFTER

BEFORE

Formerly, Vestergade Vest and Mageløs had more than two hundred buses passing every day causing noisy pollution, air pollution and also inhibiting a more friendly space for pedestrians, cyclists and other potential activities in the public space.

AFTER

After the urban transformation, the public space changed its profile completely – enhancing walking, cycling, shopping, eating, playing, etc. According to the interview with Dorthe Råby and Rune Bugge Jensen, the urban transformation has been enhancing a discussion about public domain and also has regenerated the image of Vestergade Vest and Mageløs towards a lively spot.

THE COST OF VESTERGADE VEST AND MAGELØS PROJECT

Due to the municipality short budget, the technicians had to develop a proposal with a cost of only five hundred Danish krones. The challenge was rewarding and the technicians came up with a creative solution, using temporary elements that made it possible to rethink the design concept through the time.

Currently, the Technical Department from Odense Municipality is applying for more than three hundred Danish krones for further improvements in Vestergade Vest and Mageløs.

Figure 3.1.7: View of Vestergade Vest from the 10th of May 2010. Source: Odense Municipality

Figure 3.1.8: View of Vestergade Vest from the 2nd of September 2010.

DESIGN CHARACTERISTICS

DESIGN CONCEPT

Vestergade Vest and Mageløs is a very funky and diverse space encompassing cafés, entertainment, restaurants, shops, and playful elements. The street was originally a stream of cars infiltrating into the core of the city, it has now being closed off and strictly reserved for everyone from cyclists to pedestrians, families and youths. It is a very progressive shared user space created on a very low budget of only 500,000 krones, which has pushed the imagination even further into a fusion of creativity. It is also a very temporary and flexible space where experimentation can take place. Technically the street it is about 240 metres long and 15 metres wide consisting of one lane in the middle with sidewalks on both sides of the street. Fundamentally it is a continuation of the pedestrian and shopping street Vestergade.

TECHNICAL DRAWINGS

Since this project was completed on a very low budget no technical drawings were done.

Figure 3.1.9 Draft of the design concept of Vestegade Vest and Mogeløs. Source: Odense Municipality.

SURFACE AND FLOW STRUCTURE

The flow of cyclists and pedestrians at Vestergade Vest and Mageløs moves in multiple directions with the main flow of cyclists through the middle of the street. Sidewalks are reserved solely for pedestrians with the lane in the middle of the street shared equally by pedestrians and cyclists. Traffic flow in the morning is relatively calm as no pedestrians are congesting the space allowing cyclists to flow freely through. Cyclists are focused and know exactly how to navigate and avoid other cyclists.

In the afternoon the street transforms into a multiple shared space, therefore the flow is a bit more congested. The pedestrians begin to occupy the shared space in the middle of the street thus disturbing the flow of eager cyclists. Conversely there are many pedestrians crossing the street while cyclists and pedestrians are diverting into many directions creating a complex situation.

The flow structure in the afternoon is then completely different from the morning flow. In the evening the shops close down at 6 pm and people begin to bounce around the space in multiple directions crowding the infrastructure, some going out for dinner, some going out to get drunk. At the same time cyclists are eager to ride fast through the street creating a complex and chaotic zone where cyclists need be weary of crossing pedestrians, and pedestrians need to be weary of fast moving cyclists (Figure 3.1.10).

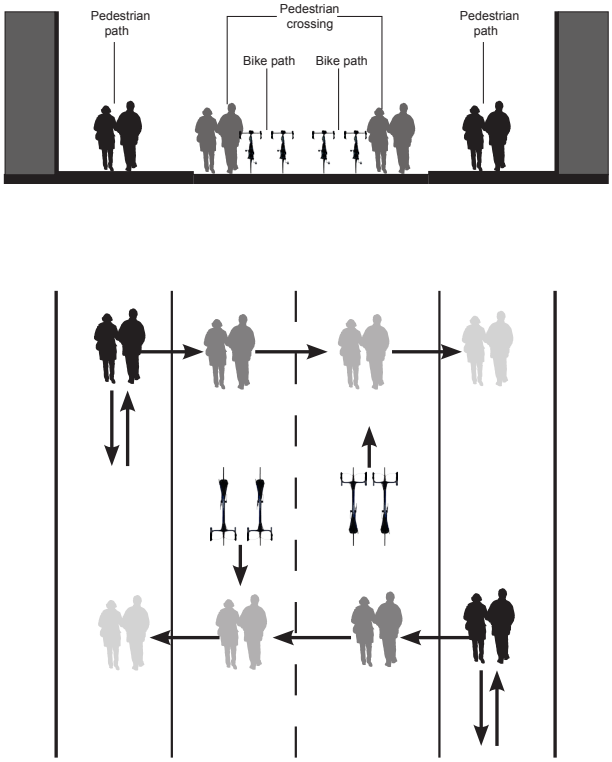


Figure 3.1.10 Section and plan of Vestergade Vest and Mageløs.

PAVING MATERIAL DESIGN

The pavement in the street utilises a flagstone material. The sidewalks are in a light color in contrast to the lane in the middle of the street which is in a darker color. Between the lane and the sidewalk there is a line made of the same flagstones turned in the other direction. The lane is lowered by 10 cm and together with the opposite stones it marks the border between the two speed levels. (Figure 3.1.11)

To slow down the speed of the cyclists there is a speed bump placed in one of the most critical points of the street where many programs like a café, ping pong tables and shops are placed side by side (Figure 3.1.12). In the morning cyclists are trying to avoid the speed bump by taking a detour at the sidewalk instead of continuing the lane. In the afternoon it is more difficult for the cyclists to avoid the speed bump because of the crowded pedestrian flow on the sidewalks (Figure 3.1.13)

On the sidewalks there are blue plastic guides integrated in the pavement showing where the shops are allowed to place their signs and articles see Figure 3.16. This solution is good for the pedestrians because it ensures that they have enough room for walking. The guides help give the shop owners borders for their signs, however some shops like Superbrugsen challenge the signage and place their signs into in the middle of the street which creates less room for the cyclists and pedestrians. The surface of the street is generally in a good condition and it has not been modified at all. Also there are no cracks and potholes which mean that it is safe for the users to move on the street (Figure 3.1.14).

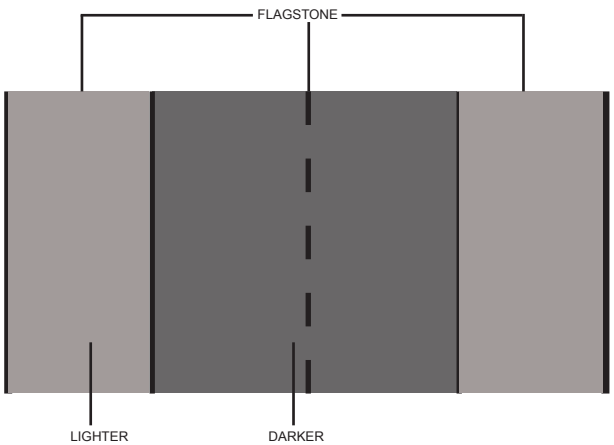


Figure 3.1.11: Pavement material.

Figure 3.1.12: Speed hump at Vestergade Vest

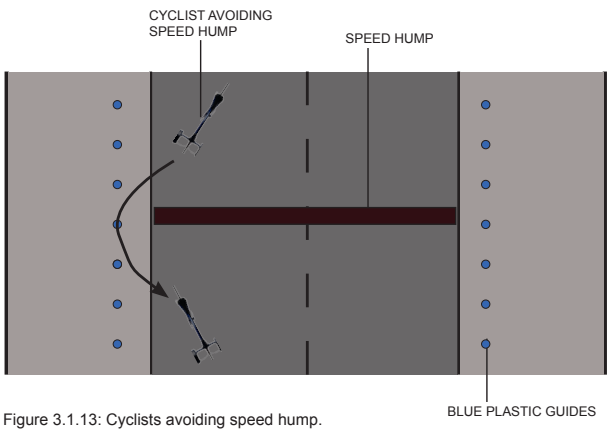


Figure 3.1.13: Cyclists avoiding speed hump.

Figure 3.1.14: Blue plastic guides at Vestergade Vest.

VELOCITIES

In the morning the street is not occupied by shop signs or café tables like it is in the afternoon making it possible for the cyclists and delivery vans to move swiftly unobstructed through the street. On contrary to the afternoon when the street is more crowded producing a more congested and chaotic flow. However cyclists still persist to ride at high speeds, but they are disturbed by pedestrians moving in multiple directions and at slower paces. It means that the cyclists sometimes have to brake suddenly or come to a complete stop and carry their bike through the space.

In the evening the street is calmer and there are not as many people on the street so cyclists can go a lot faster. To restrict cyclists going to too fast a speed hump has been built into the street, although as previously mentioned many cyclists go onto the pedestrian path to avoid the speed hump (Figure 3.1.15).

Figure 3.1.15: Speed hump

VEHICLES

Vehicles are not allowed to enter the street, but it's possible for delivery vans with an errand to enter the street during the day, but they must take the cyclists and pedestrians into consideration. Also from 10pm to 6am, taxis are permitted in the area.

When a delivery van or a cargo truck is driving through the street it blocks the street and it is not easy for the cyclists and pedestrians to access the street in their usual way. They have to find another way to get through the street and sometimes the cyclists have to get off their bike. There is also a big problem with the mopeds, which disturb the street because of their speed and noisy sounds.

Figure 3.1.16: Cargo trucks

Figure 3.1.17: Bikes and motorized vehicles

BICYCLE PARKING

One of the main elements in the shared space is the bike parking racks, which makes it possible for the cyclists to park their bikes right in the center of the pedestrian shopping area. In the afternoon the racks are full and occupy a major part of the shared user space and congest the room of pedestrian flow. In the morning and evening time there is not so many bicycles parked in the racks thus freeing up the space more (Figure 3.1.18 and Figure 3.1.19).

Even though there are many bicycle racks a large amount of bikes are parked in front of the shops and lean against signs, taking up a lot of the space on the sidewalks thus making it difficult for the pedestrians to move unobstructed (Figure 3.1.20 and 3.1.21).

Figure 3.1.18: Bike parking racks.

Figure 3.1.19: Bike parking racks

Figure 3.1.20: Parked bikes in front of shops

Figure 3.1.21: Parked bikes in front of shops

TREES AND LANDSCAPING DESIGN

The most dominating greenery in the streetscape are the trees. Different kinds of trees exist but the most common is the marble tree, which is placed in the centerline of the sidewalks (Figure 3.1.22).

Additionally there are different kind of green elements, like small flower bowls and green fences, which are used by the shops and cafés to define the entrances or the private space for café tables. In one spot there are a couple of big flower bowls placed between the lane and the sidewalk. The placement and existence of the green elements produces a warm and inviting atmosphere (Figure 3.1.23).

Figure 3.1.22: Trees and landscaping design

Figure 3.1.23: Trees and landscaping design

STREET FURNITURE

Technical elements

Garbage bins are placed at the sidewalks and have different shapes and characters. Some of them are standing on the ground and some are lifted up from the ground by rods. And several of them have special notes to make people use them. In front of all the entrances and the backyards to the street small poles have been erected to prevent vehicles from entering the space.

Urban elements

There are no benches in the street and if people want to sit down they must go to a café or to the benches at the pedestrian shopping streets.

The street also contains colorful playful elements which include a couple of ping pong tables and a letter game which is drawn on the ground (see Figures 3.1.24 and 3.1.26). In the afternoon the street is usually very crowded and it is difficult to use the playful elements, but in the morning and evening it is calmer creating more access to use them. The playful elements supply the street with a more lively and relaxed atmosphere and enhance the concept of a shared user space (Figure 3.1.25).

Figure 3.1.24 Street games painted in the pavement.

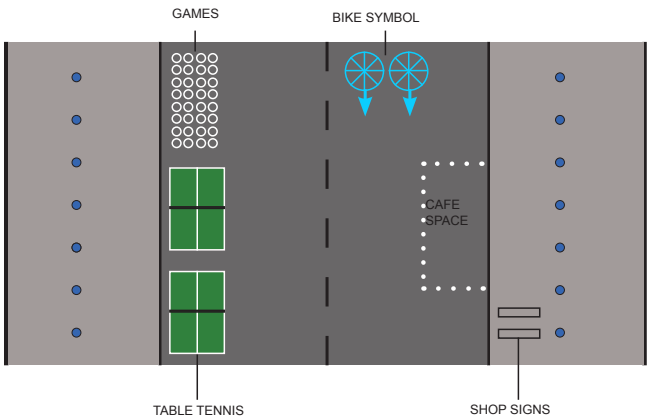


Figure 3.1.25: Layout of streetscape.

Figure 3.1.26: Street furniture

STREET LIGHTS

In the evening the street is lit up by hanging street lamps from the middle of the street and by lamps placed on the sidewalks. Additionally the shop windows light up the street creating a more inviting night atmosphere (Figure 3.1.27).

Figure 3.1.27: Street lights

SIGNAGE

The street offers different kinds of signs which give information about various subjects. The most dominating signs in the street are the shop signs which are placed at the entrances or at the front of the shops (Figure 3.28). These signs are very noticeable due to their use of the colorful graphics and design. Other signage includes information by municipality dictating different rules about the traffic flow and other transportation modes that are allowed to enter the street (Figure 3.1.29). Some of them also give information about attractions in the city that may be interesting to visit. They designed to look old and lead you to different parts of the city such as cultural sites like squares, theaters, museums and other exciting places (Figure 3.1.31). The last category of signs is those which are integrated into the design of the street. These signs give information about the use of the space in a more playful way and is indicated by the symbol of a footprint and bicycle wheels painted onto the pavement (Figure 3.1.30)

In general there are no signs in the street telling you about speed and behavior, but that is also the concept of shared space. The signage is functional because it both gives information about legal and cultural issues relating to the city.

Figure 3.1.28: Shop signs.

Figure 3.1.29: Signage dictating rules about how to use the space.

Figure 3.1.30: Playful sign informing the transportation modes allowed.

Figure 3.1.31: Signage designed to look old.

PUBLIC ART OR OTHER UNIQUE FEATURES

The street pavement hosts some kind of art in the form of painted words which gives synonymous of the street name; Mageløs. This is located only at one spot in the street and does not repeat in other places (Figure 3.1.32).

Figure 3.1.32: Painted words in the pavement.

ACCESSIBILITY AND INTERSECTIONS

The street is accessed from the intersection of Vesterbro and Ny Vestergade on the western end, from a crossing of two pedestrian streets, Vestergade(east) and Kongensgade, and from Mageløs which is a shared cyclist and pedestrian street, in the eastern end.

Where Vestedgade Vest and Mageløs meet there is a change in the materials which marks that you have to slow down and be aware of the street. Entrance from Vesterbro is marked with a shift from asphalt paving continuing around a curve and the pedestrian sidewalk continuing in a similar curve. This facility was probably made to signal no entry for cars in the former one-way street in Vestergade. Entering the street happens from a dedicated bicycle path. When leaving, a bicycle path does not appear until approximately 300 meters later.

Only one byway is entering the street. The street, Pantheonsgade, is located 70 meters from the exit in western end. The entrance to Vestergade is made with no regulations, but like mentioned earlier a path of special pavement has been implemented in Vestergade to signal the beginning of the byway.

Compensating for the minimum byways is a series of small corridors through and between buildings opening up for cyclists and pedestrians to enter the street. The entrance from east is in a cross of two pedestrian streets in eastern direction, Vestergade-east, and northern direction, Kongensgade, and the continuous shared space between cyclists and pedestrians in the southern direction in the street Mageløs. The link between the two streets has been marked with a curve, signalising that this is only road to enter for cyclists. The link is paved with cobbled stones, different from both the pavement on Vestergade and in the pedestrian streets (Figure 3.1.33 and 3.1.34).

Figure 3.1.33: Crossing point paved with cobbled stones.

Figure 3.1.34: Intersection between Vestergade Vest and Mageløs.

BUILT ENVIRONMENT AND USES

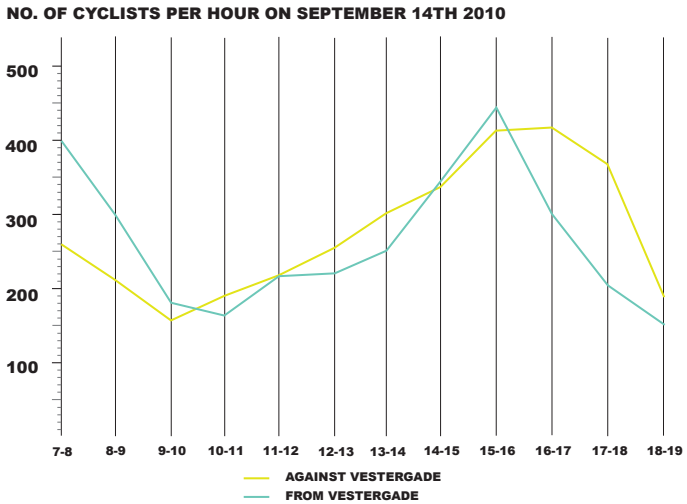
The street is faced by buildings with two to four stories. The ground floor is primarily used for commercial activity with shops, cafes and food vendors. The higher stories are used for residences.

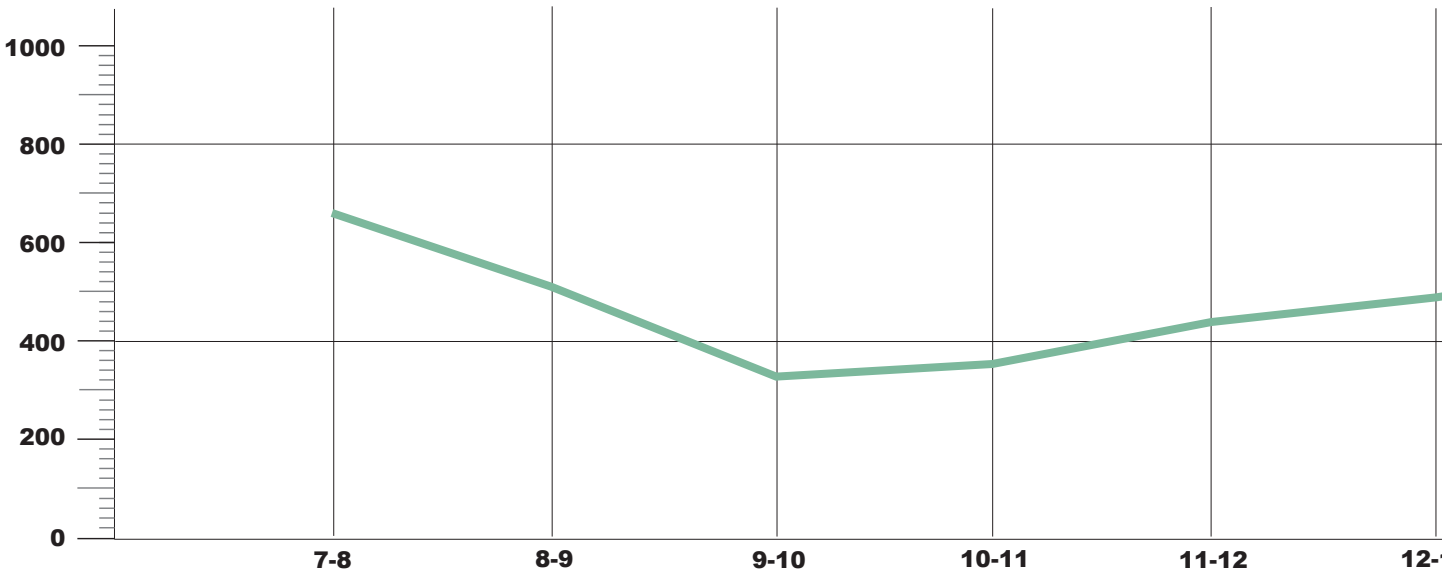
The buildings facing the street are part of a medieval structure with various different building volumes behind them. The blocks are not enclosed block structures, rather small open networks within the blocks. Many people enter the street through building corridors coming from the spaces behind the buildings facing the street (Figure 3.1.35)

Figure 3.1.35: Built environment around Vestergade Vest and Mageløs.

CYCLIST COUNTINGS

NUMBER OF CYCLISTS





7-8

700 bikes
Bicycles in high speed. No other transportation modes

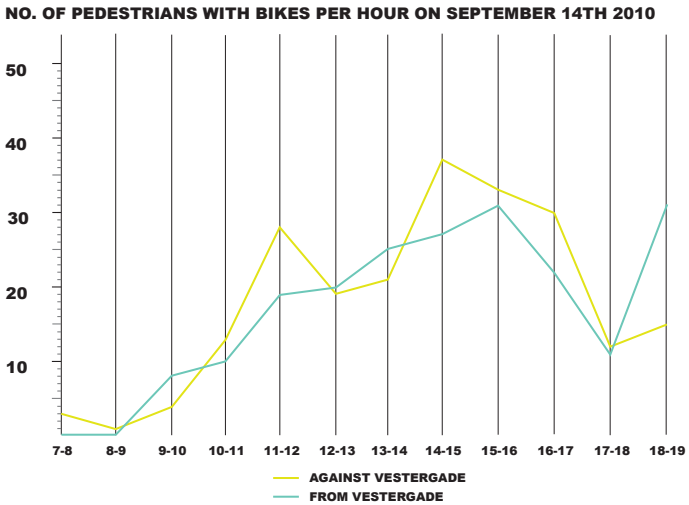
9-10

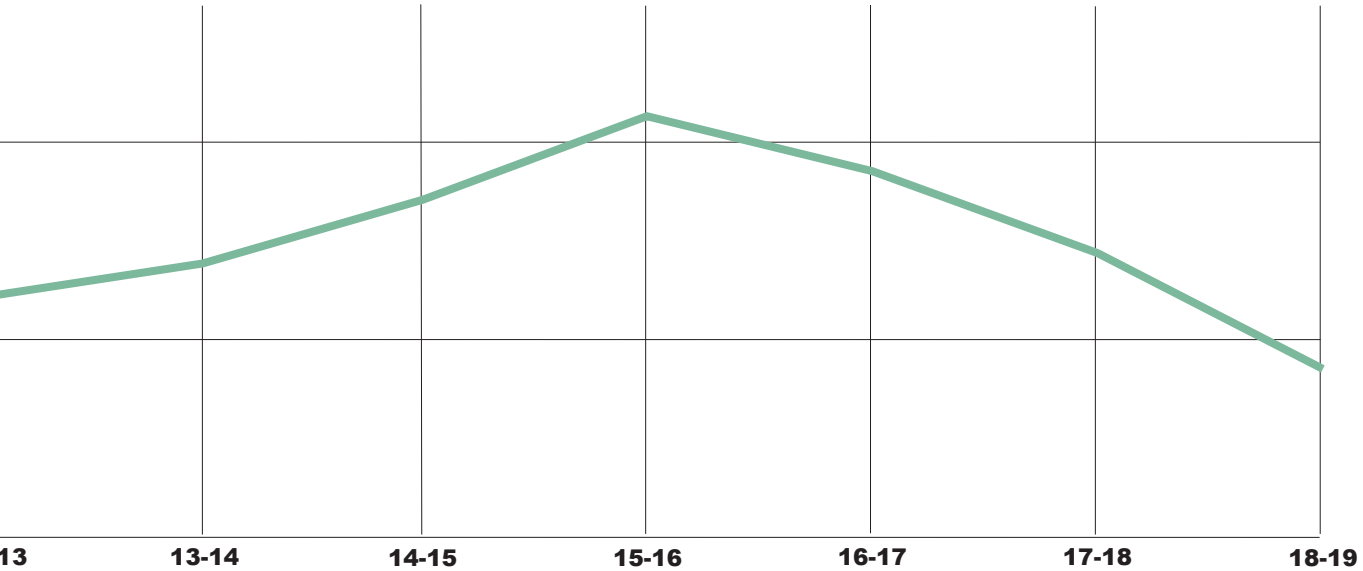
350 bikes
Cargo hour and lowest numbers in morning.

12-13

500 bikes
Different transportation modes and uses in the street.

Figure 3.1.36: Cyclists counting and traffic flow at Vestergade Vest and Mageløs.





15-16

850 bikes
Large number of cyclists and pedestrians. Different transportation modes and uses in the street.

18-19

380 bikes
Street gets empty and cyclists riding their bikes in high speed

THE WEB SURVEY

The web survey analysis is divided in four sections. Firstly, main findings are presented. The second section describes the spatial distribution of the residential location of the respondents. Thirdly, it is presented a descriptive statistic to analyze all the answers. In search of finding relationships between socio-demographic variables and the web survey answers, the last section presents a statistical analysis using the Chi2 test.

A total of 298 individuals that were riding a bike at Vestergade Vest on September 14 answered the questionnaire in the period between September 14 and October 12.

From the count done in September 14, there were 6446 bicycle trips at Vestergade Vest from 7am until 7pm – including both directions. Estimating that 35% of these cyclists ride their bikes at least once per day in the infrastructure, it was stipulated a total of 4189 individuals ride a bike at Vestergade Vest per day.

A total of 1328 web flyers were distributed to individuals riding their bikes in the infrastructure from 7am until 7pm and from these total 298 answered the questionnaire.

Based on these figures, the respondents represents 7,12% of the total of individuals riding a bike per day in the infrastructure and 22,43% of individuals that collected the flyer on September 14 while riding a bike.

MAIN FINDINGS

In conclusion the data from the survey reveals a picture of Vestergade Vest as a piece of infrastructure used for a balanced distribution of purposes (39% to work, 34% to shopping, 15% educational institutions and 12% to others destinations). The figures are directly connected to the built environment were the infrastructure is located – the core of the city with several working places, shops and educational institutions in the surroundings.

After the Chi2 test was applied, the results highlight that most of the answers do not have a relation with socio-demographic conditions. However, some representative relations between the independent variables – gender, age and educational level – and the questionnaire answers were identified.

There is a relation between the main trip purpose when riding a bike at Vestergade Vest and both gender, age and educational level.

The impact of the intervention in Vestergade Vest in the individuals` decision to ride a bike more often has also a relation both with gender, age and educational level.

The findings highlight that gender is a strategic variable which has a relation with the satisfaction with the design solution for Vestergade Vest, safety and signage conditions at the infrastructure.

Finally, age seems to have a relation with the frequency that individuals ride a bike at Vestergade Vest and their opinion on regards obstacles against cyclists riding at the infrastructure.

The following section provides the actual data for each of the questions asked.

RESIDENTIAL LOCATION OF RESPONDENTS

The residential addresses of the respondents – individuals riding a bike at Vestergade Vest and Mageløs on September 14 – were registered and geo-referenced in order to produce a map (see Figure 3.37). According to the Table 3.43, the majority of the respondents (65,9%) live within a radius of 2 kilometer and 92,6% of them living within 5 kilometers distance from the infrastructure.

Respondents living more than 5 kilometers from the infrastructure correspond to 7,4% of the total and from this amount only 14,2% are living more than 10 kilometers away of the infrastructure.

	0-1 KM	1-2 KM	2-3 KM	3-4 KM	4-5 KM	5-10 KM	10-15 KM	15-20 KM	20 KM<
NO. DWELLINGS	134	62	42	20	17	19	1	2	1
% DWELLINGS	45,0%	20,8%	14,1%	6,7%	5,7%	6,4%	0,3%	0,7%	0,3%

Table 3.1.1: Absolute and percentage distribution of respondents according to the distance of their residential location from Vestergade Vest and Mageløs.

Figure 3.1.37: Spatial distribution of the respondents according to their residential location – 5km map.

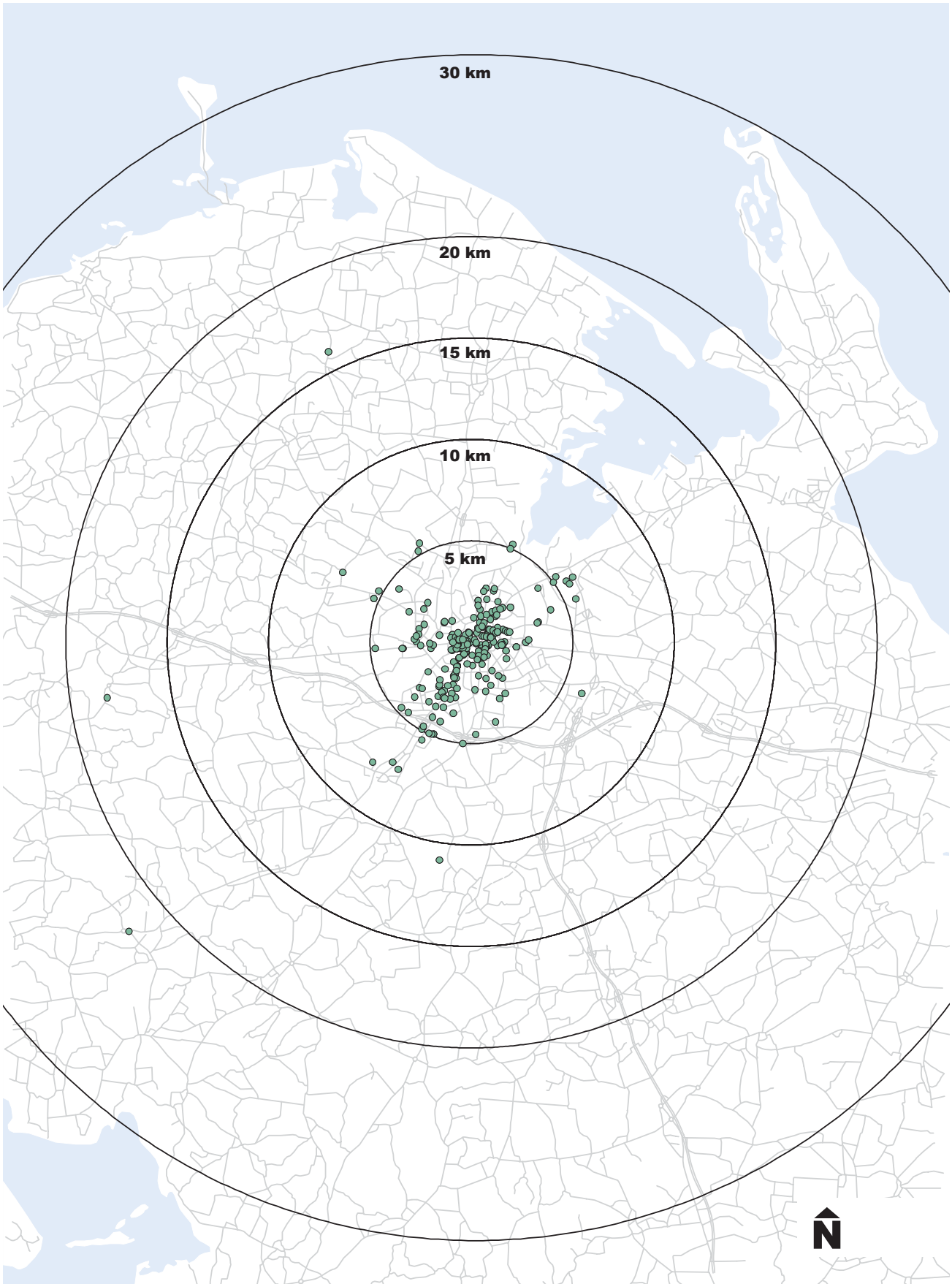


Figure 3.1.38: Spatial distribution of the respondents according to their residential location - 20km map

DESCRIPTIVE STATISTICS

AGE

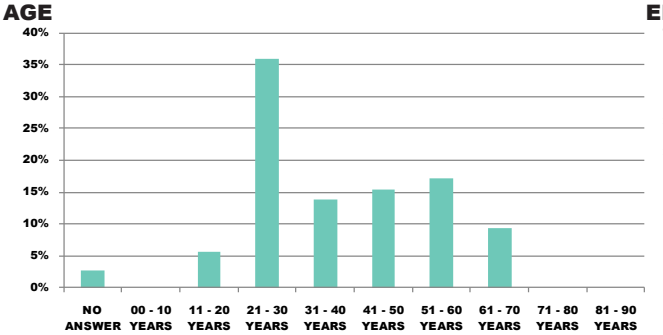


Figure 3.1.39: Distribution of the respondents by age groups.

EDUCATION LEVEL

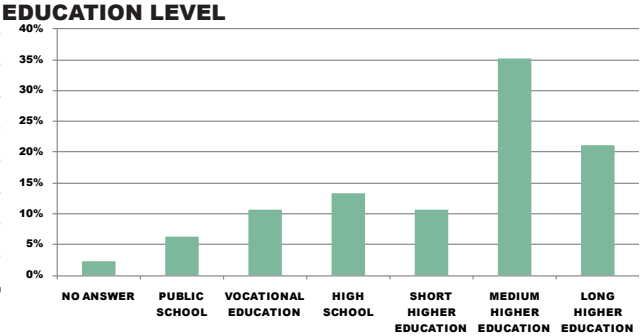


Figure 3.1.41: Distribution of the respondents by educational level.

The majority of the respondents at Vestergade Vest and Mageløs are between 21-30 years of age (36%), followed by respondents aged 31-40 (14%), 41-50 aged (15%), and 51-60 aged (17%). Older respondents range from 61-70 years old (9%). Younger respondents were aged between 11-20 (6%), and 3% gave no answer. This results shows that Vestergade Vest and Mageløs mainly is used by the younger generation of 21-30 years old followed by a more even distribution of people between the ages 31-70 and 11-20.

A large majority of respondents answered that they have a medium and long high education (35%), followed by a long, higher education (21%). 11% respondents answered that they had attended higher education for a short amount of time, and another 11% respondents answered a vocational education. 13% of the respondents had a gymnasium education, 6% had receiving a public school education, and 2% giving no answer. The majority of the respondents using Vestergade Vest therefore have a medium higher education followed by a long higher education.

GENDER

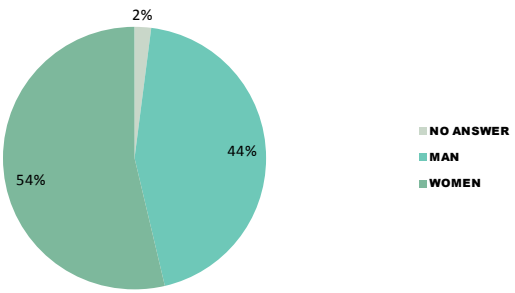


Figure 3.1.40: Distribution of the respondents by gender

RIDING A BIKE AT VESTERGADE VEST

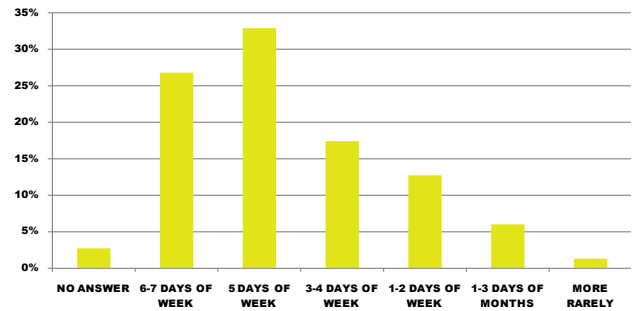


Figure 3.1.42: Distribution of the respondents by the frequency they ride a bicycle at Vestergade Vest and Mageløs.

When asked about their gender, 54% (160) of the respondents were women and 44% (132) were men, with 2% (6) giving no answer.

When asked how often they bike at the site, a majority of the respondents said that they use Vestergade Vest 5 days per week (33%) or 6-7 days per week (27%). 17% of the respondents used the site 3-4 days per week, 13% answered 1-2 days per week, 6% answered 1-3 days per month and only 1% rarely ride a bike at Vestergade Vest. The figures highlight that the site is a place where people bike many days of the week.

WALKING AT VESTERGADE VEST

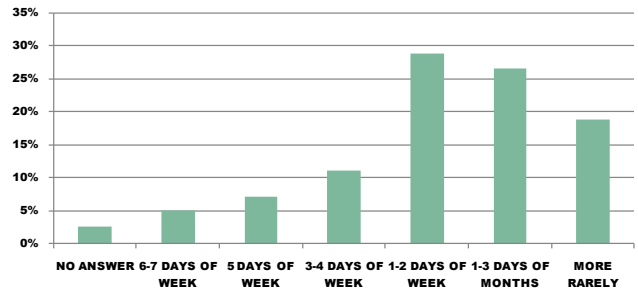


Figure 3.1.43: Distribution of the respondents by the frequency they walk at Vestergade Vest and Mageløs.

Respondents were asked if they walk or stay at Vestergade Vest and Mageløs without bike. The three main groups of respondents answered 1-2 days of week (29%), 1-3 days of months (27%) or rarely without bike (19%). 11% answered 3-4 days a week, 7% answered 5 days a week, 5% 6-7 days of week and 3% gave no answer. The results show that cyclists do also use Vestergade Vest and Mageløs for walking.

MAIN TRIP PURPOSE

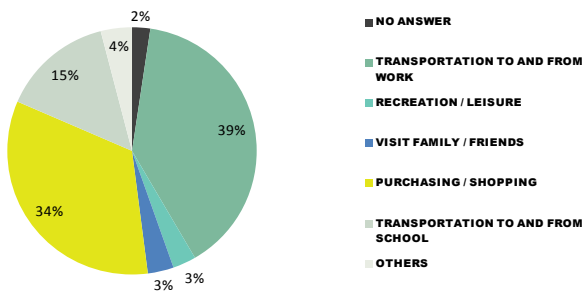


Figure 3.1.44: Distribution of the respondents according to the main trip purpose when riding a bike at Vestergade Vest and Mageløs.

When asked for what purpose the respondents use Vestergade. 39% answered that they use the infrastructure for commuting to and from work. 34% used Vestergade for shopping, 15% used it to commute to school, 3% answered to see friends or family, 3% for recreation, 4% said other and 2% gave no answer. This figure shows that Vestergade Vest and Mageløs mainly is an urban space used for commuting and shopping.

FREQUENCY OF TRIPS TO THE MAIN PURPOSE

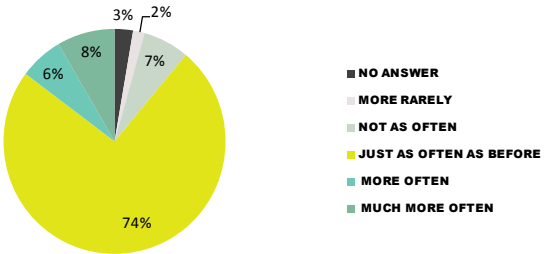


Figure 3.1.45: Distribution of the respondents by the frequency they ride a bike in Vestergade Vest and Mageløs for the main purpose mentioned in the Figure 3.1.44 after the intervention in the site.

Respondents were asked, how often they used the bike for their main purpose as answered in the previous question after the opening of Vestergade Vest and Mageløs. 74% of respondents answered that they travel for that purpose just as often as before. 6% of respondents stated that they bike for that purpose more often and 8% said much more often. 7% answered that they traveled less often and 2% much less often. 3% gave no answer. This data indicates that the opening of Vestergade Vest and Mageløs has had a very small impact on the amount of travelers. 14% in total traveling more often and 9% in total

SATISFACTION WITH VESTERGADE VEST

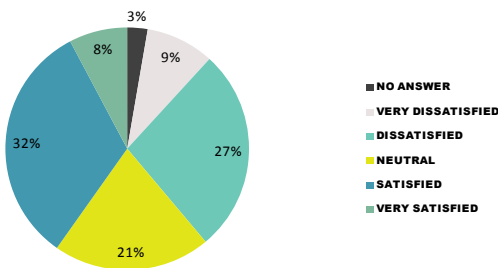


Figure 3.1.46: Distribution of the respondents by the level of satisfaction with the design of Vestergade Vest and Mageløs.

When asked how satisfied the respondents were with Vestergade Vest and Mageløs 32% said they were satisfied and 27% were very satisfied. 21% were neutral, 8% were dissatisfied and 9% very dissatisfied. 3% gave no answer. This figure shows that only a little more than half (59%) of the respondents are satisfied with urban space and 17% of the users have issues with the design. Therefore there are issues that need to be improved to get a higher level of satisfied people.

VESTERGADE VEST AND MAGELØS' DESIGN AND SAFETY

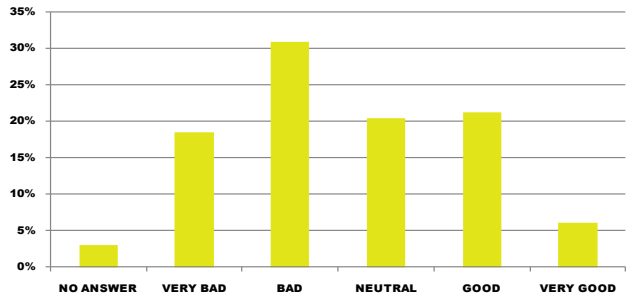


Figure 3.1.47: Distribution of the respondents according to their opinion about how the Vestergade Vest`s design fulfilled the bicyclist safety aspect.

Users were asked about the quality regarding the safety needs of the infrastructure. The largest amount of respondents (31%) thought the design did a bad job and 18% stated that it did a very bad job. 20% were neutral on the issue, and only 6%% answered it did a very good job and 21% that it did a good job. 3% gave no answer. This result thereby shows that there are great problems with the perception of cyclists in regards safety at safety Vestergade Vest and Mageløs.

VESTERGADE VEST AND MAGELØS' DESIGN AND FAST CONNECTIVITY

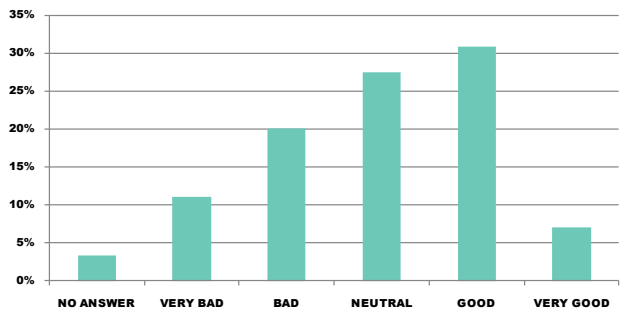


Figure 3.1.48: Distribution of the respondents according to their opinion about how the Vestergade Vest and Mageløs` design fulfilled the fast connectivity.

Respondents were asked if they thought the design of Vestergade Vest and Mageløs was facilitating fast connections. The majority responded said it did a good job (31%) or were neutral (28%). 7% thought it did a very good job, 20% said it did a bad job, and 11% said a very bad job. 3% respondents gave no answer. From this figure, it is clear that Vestergade Vest and Mageløs can be improved in regards to the speed of the bikers.

VESTERGADE VEST AND MAGELØS' DESIGN AND AESTHETICS

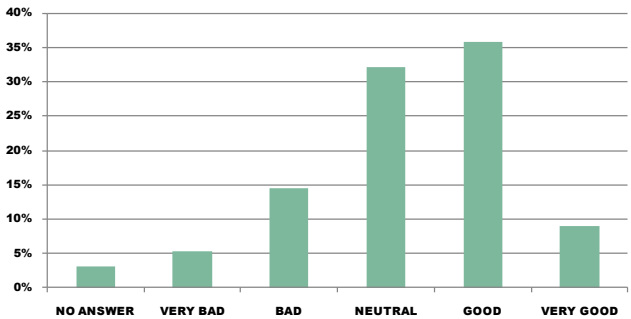


Figure 3.1.49: Distribution of the respondents according to their opinion about how the Vestergade Vest and Mageløs' design fulfilled the aesthetics aspect.

The respondents were asked about the aesthetics of the design of Vestergade Vest and Mageløs, and the majority of respondents stated that it either did very good (36%) or a very good (9%) job. A great part of the respondents were neutral (96) in regards to beauty and aesthetics. 14% said it did a bad job and 5% said a very bad job. 3% were giving no answer. The figure shows that there is room for improving the aesthetics of the space even though the largest amount people are satisfied.

ILLEGALLY PARKED BICYCLES

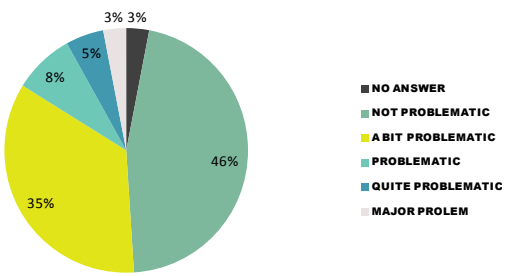


Figure 3.1.50: Distribution of the respondents according to their opinion about how problematic illegal parking of bicycles is at Vestergade Vest and Mageløs.

Users were asked if they thought that illegally parked bicycles were a problem on the Vestergade Vest and Mageløs. 46% of the responses said that they were not a problem, 35% said it was a small problem, 8% said it was problematic, 5% said it was quite problematic, and 3% said it was a major problem. 3% gave no answer. This figure shows that illegally parked bicycles are a problem at Vestergade Vest and Mageløs for the main part of the users.

CONFLICT BETWEEN DIFFERENT TRANSPORT MODES

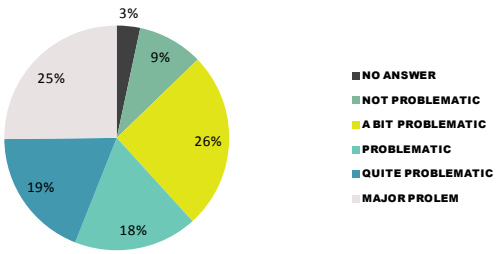


Figure 3.1.51: Distribution of the respondents according to their opinion about how problematic is the conflict between different transport modes at Vestergade Vest and Mageløs.

Respondents having conflicts between cyclists, pedestrians and motorized vehicle drivers. Only 18% saying it was not a problem. 26% stated that is was a bit of a problem, 18% claimed it was problematic, 19% said it was quite a problem, and 25% responded that said it was a major problem. 3% gave no answer on whether passing space was an issue. A large amount of 25% saying that the boundaries of the bike lanes are a major problem clearly indicates that this is an area where the design can be improved.

OBSTACLES

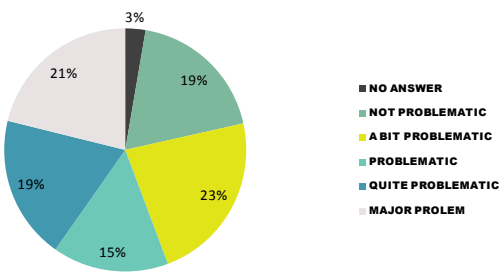


Figure 3.1.52: Distribution of the respondents according to their opinion about how problematic the existence of obstacles is against the cyclists at Vestergade Vest and Mageløs.

Respondents were asked whether they thought obstacles at Vestergade Vest and Mageløs were an issue. Only 19% of the respondent stated that obstacles were not a problem. 23% stated that is was a small problem, 15% claimed it was problematic, 19% quite problematic and 21% saying it is a major problem. 3% gave no answer. This figure shows that the majority of users also see obstacles as being an issue at Vestergade Vest and Mageløs.

PAVEMENT PROBLEMS

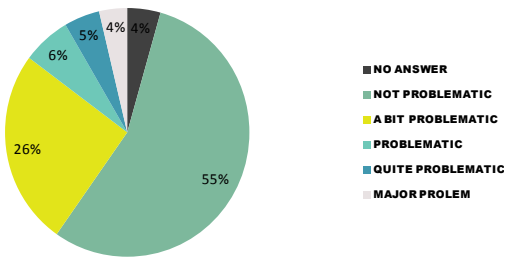


Figure 3.1.53: Distribution of the respondents according to their opinion about how problematic the pavement is at Vestergade Vest and Mageløs.

When asked whether they thought surface issues like potholes were a problem on Vestergade Vest and Mageløs, 55% of the responses said it was not a problem. 26% stated that it was a small problem, 6% claimed it was problematic, 5% it was quite problematic and 4% is was a major problem. 4% gave no answer. This figure shows Vestergade Vest and Mageløs has been maintained, and therefore has a great percentage of satisfied users in this area compared with the other problems the site is facing.

CRACKS IN RAMPS AND INTERSECTIONS

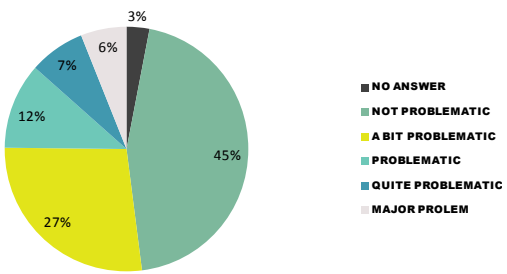


Figure 3.1.54: Distribution of the respondents according to their opinion about how problematic the existence of cracks in ramps and intersections is at Vestergade Vest and Mageløs.

Users were asked whether they thought cracks were a problem on ramps and intersections. 45% of the responses said it was not a problem. 27% thought that it was a small problem, 12% claimed it was problematic, 7% said it was quite a problem and 6% said it was major problem. 3% gave no answer. These results show that cracks in ramps and intersections are a small problem, one that could be fixed with maintenance.

AWARENESS OF PEDESTRIANS AND MOTORIZED VEHICLE DRIVERS FOR CYCLISTS

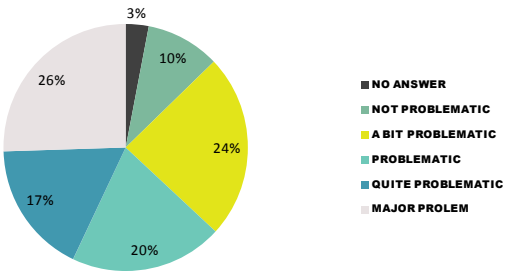


Figure 3.1.55: Distribution of the respondents according to their opinion about how problematic the lack of awareness of pedestrians and motorized vehicle drivers is for people riding a bike at Vestergade Vest and Mageløs.

Respondents were asked whether they thought lack of awareness of pedestrians and motorized vehicle drivers for cyclists was an issue. For the greatest part of the respondents (26%) the lack of awareness for cyclists was a major problem. 24% said it was a small problem, 20% stated it was problematic and 17% said it was quite a problem. Only 10% of the respondents said it is not a problem. And 3% gave no answer. This figure shows that cyclists perceive a problem in regards the awareness of pedestrians and motorized vehicle drivers for cyclists.

SIGNPOSTING AND ITS INTERPRETATION

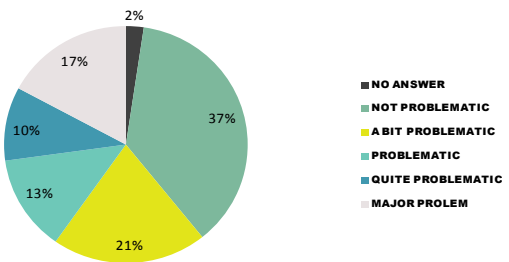


Figure 3.1.56: Distribution of the respondents according to their opinion about how problematic signposting and its interpretation is at Vestergade Vest and Mageløs.

When asked whether poor signage was an issue, 37% of the responses said it was not a problem, 21% said it was a small problem, 13% stated it was problematic, 10% said it was quite a problem and 17% said it was a major problem. 2% gave no answer. This figure shows that signage is also a problem for the bikers at Vestergade Vest and Mageløs, which thereby could be made more clearly to the user.

SCENIC

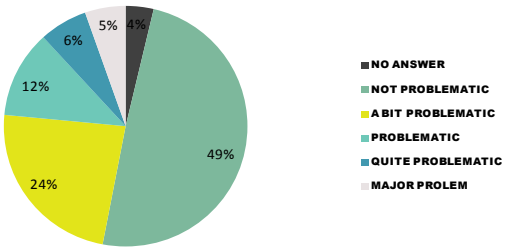


Figure 3.1.57: Distribution of the respondents according to their opinion about how problematic scenic and greenery is at Vestergade Vest and Mageløs.

When asked whether they thought poor greenery and scenic landscaping was an issue at Vestergade Vest, 49% of the responses said it was not a problem, 24% said it was a small problem, 12% stated it was problematic, 6% said it was quite a problem, and 4% responded that this was a major problem. 4% gave no answer. This figure shows that greenery can be a problem and that the lack of it is noticed by some users but also that almost 50% of the users are satisfied with the situation as it is.

BIKING MORE OFTEN AFTER VESTERGADE VEST AND MAGELØS' INTERVENTION

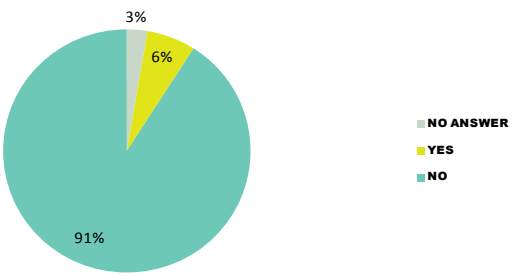


Figure 3.1.58: Distribution of the respondents based on starting to ride a bike more often, or not, after the intervention at Vestergade Vest and Mageløs.

When asked whether they bike more often after the opening of Vestergade Vest and Mageløs, 91% said they have not biked more while only 6% said that they where biking more often that before. 3% gave no answer. This figure shows that the opening of Vestergade Vest and Mageløs has not change the use of bikes in the area. The reasons of this can be the problems showed in the previous questions that indicate that there are issues such as insensitivity, poor maintaining and problems with the design that is dissatisfying for the bikers.

QUALITIES INFLUENCING TO RIDE A BIKE

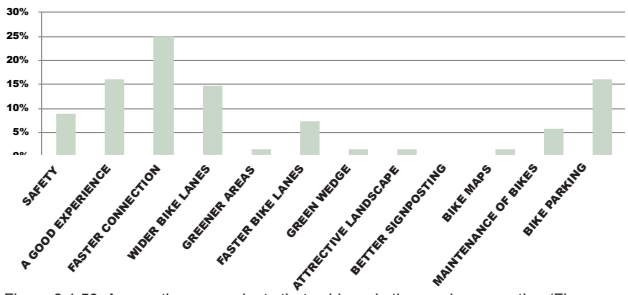


Figure 3.1.59: Among the respondents that said yes in the previous question (Figure 3.1.58), what qualities has influenced their choice to ride a bike more often after the intervention in Vestergade Vest and Mageløs. The respondents could choice more than one option.

Respondents were asked what aspect of the intervention make them ride their bike more often, the largest portion of users stated that faster connections (25%) made the largest impact. 16% responded saying bike parking was a good experience and influenced bikeability. 15% stated wider bike lanes made an impact for them and 7% said faster bike lanes made the difference for them. Important factors that influenced the amount users rode were therefore a faster connection and the space for bike parking. The good experience and the width of the lanes was also some of the factors that played a key role for the choice of biking.

STREET DESIGN INFLUENCING TO RIDE A BIKE

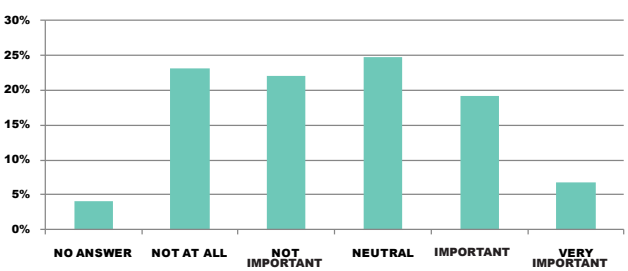


Figure 3.1.60: Distribution of respondents according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Users were asked, how important is street design in your decision to ride your bicycle. The largest portion (25%) of respondents answered saying that they were neutral to the question. 19% said it was important and 7% said it was very important. 22% said it was not important, and 23% said it was not important at all. 4% did not answer. This figure shows that the majority of respondents do not think that the design of Vestergade Vest and Mageløs is a very important factor for the bikeability of the site.

STREET DESIGN SOLUTIONS AT VESTERGADE VEST AND MAGELØS

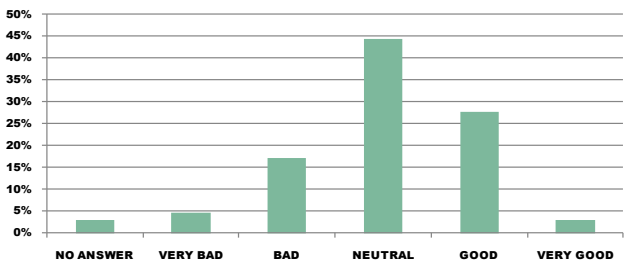


Figure 3.1.61 Distribution of respondents according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in the intervention at Vestergade Vest and Mageløs.

When asked for their opinion on the design solution applied to Vestergade Vest and Mageløs, most respondents replied that they were neutral (44%) in that question. 28% said it is a good solution and 3% believed it was a very good design solution. 17% thought it was poor, 5% responded very poor, and 3% gave no answer. This figure shows that many of the respondents were neutral in their opinion of the design. This could reflect that the design is not very noticeable and that they take it for granted. There is also a great part that think the design is good which also reflects that there are only small problems with the design.

RELATIONS BETWEEN SOCIO-DEMOGRAPHIC VARIABLES AND WEB-SURVEY ANSWERS

The Chi2 test was applied to identify possible relations between the socio-demographics (independent variables) of the sample and their answers from the web survey (dependable variables). Considering the nature of the studied variables – the majority of them are nominal – the Chi2 test was selected to this analysis.

The Chi2 test is about finding out if there is a connection between the variables. It is about testing the nul hypothesis. H0 says that the variables are statistic independent and HA says the variables are statistic dependent. To the test we set a α-level at 0,05. In the case of the p-value is under that, we can not reject the nul hypothesis.

SOCIO-DEMOGRAPHICS AND RIDING A BIKE AT VESTERGADE VEST AND MAGELØS

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
MALE	33	43	29	16	8	1	130
FEMALE	47	55	22	22	10	3	159
TOTAL	80	98	51	38	18	4	289

Table 3.1.2: Distribution of the respondents by gender according to the frequency they ride a bicycle at Vestergade Vest and Mageløs.

Out of the Table 3.1.2, the SPSS calculated the Chi2 to be 4,182 with a degree of freedom (df) 5 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
PUBLIC SCHOOL	7	3	3	2	2	1	19
VOCATIONAL EDUC.	6	17	3	2	3	1	32
HIGH SCHOOL	16	11	8	4	1	0	40
SHORT HIGHER EDUC.	7	13	5	2	2	1	30
MEDIUM HIGHER EDUC.	24	31	22	22	5	1	105
LONG HIGHER EDUC.	20	22	11	6	4	0	63
TOTAL	80	97	52	38	18	4	289

Table 3.1.3: Distribution of the respondents by educational level according to the frequency they ride a bicycle at Vestergade Vest.

Out of the Table 3.1.3, the SPSS calculated the Chi2 to be 32,170 with a degree of freedom (df) 25 and the missing values are 9. P is between 0,250 and 0,100. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
01-20 YEARS	8	3	4	0	0	1	16
21-30 YEARS	34	30	21	15	5	0	105
31-40 YEARS	7	12	11	6	4	0	40
41-50 YEARS	15	18	4	3	4	1	45
51-60 YEARS	13	23	4	6	2	2	50
61-90 YEARS	2	9	7	7	2	0	27
TOTAL	79	95	51	37	17	4	283

Table 3.1.4 Distribution of the respondents by age groups according to the frequency they ride a bicycle at Vestergade Vest and Mageløs.

Out of the Table 3.1.4, the SPSS calculated the Chi2 to be 41,188 with a degree of freedom (df) 25 and the missing values are 15. P is between 0,025 and 0,010. Therefore, the variables are dependent.

SOCIO-DEMOGRAPHICS AND WALKING AT VESTERGADE VEST AND MAGELØS

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
MALE	7	8	19	38	32	25	129
FEMALE	8	13	14	48	47	30	160
TOTAL	15	21	33	86	79	55	289

Table 3.1.5: Distribution of the respondents by gender according to the frequency they walk at Vestergade Vest and Mageløs.

Out of the Table 3.1.5, the SPSS calculated the Chi2 to be 3,192 with a degree of freedom (df) 5 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
PUBLIC SCHOOL	1	4	0	4	4	6	19
VOCATIONAL EDUC.	1	3	2	8	10	8	32
HIGH SCHOOL	1	5	8	12	7	7	40
SHORT HIGHER EDUC.	0	2	6	10	7	6	31
MEDIUM HIGHER EDUC.	6	3	10	33	27	25	104
LONG HIGHER EDUC.	6	4	7	19	23	4	63
TOTAL	15	21	33	86	78	56	289

Table 3.1.6: Distribution of the respondents by educational level according to the frequency they walk at Vestergede Vest and Mageløs.

Out of the Table 3.1.6, the SPSS calculated the Chi2 to be 35,657 with a degree of freedom (df) 25 and the missing values are 9. P is between 0,100 and 0,050. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
01-20 YEARS	0	2	3	6	4	1	16
21-30 YEARS	5	10	14	37	30	9	105
31-40 YEARS	4	1	6	11	9	10	41
41-50 YEARS	3	3	5	8	15	11	45
51-60 YEARS	3	4	2	14	14	13	50
61-90 YEARS	0	1	3	7	5	10	26
TOTAL	15	21	33	83	77	54	283

Table 3.1.7: Distribution of the respondents by age groups according to the frequency they walk at Vestergade Vest and Mageløs.

Out of the Table 3.1.7, the SPSS calculated the Chi2 to be 31,565 with a degree of freedom (df) 25 and the missing values are 15. P is between 0,250 and 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND MAIN TRIP PURPOSE

	TRANS. TO AND FROM WORK	RECREATION / LEISURE	VISIT FAMILY / FRIENDS	PURCHASING / SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
MALE	47	7	7	45	50	6	130
FEMALE	73	2	3	55	23	5	130
TOTAL	117	9	10	100	43	11	290

Table 3.1.8: Distribution of the respondents by gender according to the main trip purpose when riding a bike in Vestergade Vest and Mageløs.

Out of the Table 3.1.8, the SPSS calculated the Chi2 to be 8,901 with a degree of freedom (df) 5 and the missing values are 8. P is between 0,250 and 0,100. Therefore, the variables are independent.

	TRANS. TO AND FROM WORK	RECREA-TION / LEISURE	VISIT FAMILY / FRIENDS	PURCHA-SING / SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
PUBLIC SCHOOL	4	2	1	7	4	1	19
VOCATIONAL EDUC.	15	0	0	11	4	2	32
HIGH SCHOOL	13	2	2	9	13	1	40
SHORT HIGHER EDUC.	16	2	0	11	1	1	31
MEDIUM HIGHER EDUC.	43	2	2	41	11	6	105
LONG HIGHER EDUC.	25	1	5	21	10	1	63
TOTAL	116	9	10	100	43	12	290

Table 3.1.9: Distribution of the respondents by educational level according to the main trip purpose when riding a bike at Vestergade Vest and Mageløs.

Out of the Table 3.1.9, the SPSS calculated the Chi2 to be 35,608 with a degree of freedom (df) 25 and the missing values are 8. P is between 0,100 and 0,050. Therefore, the variables are independent.

	TRANS. TO AND FROM WORK	RECREA-TION / LEISURE	VISIT FAMILY / FRIENDS	PURCHA-SING / SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
01-20 YEARS	1	2	2	3	7	1	16
21-30 YEARS	32	2	6	30	31	4	105
31-40 YEARS	21	1	0	18	1	0	41
41-50 YEARS	29	2	2	9	0	3	45
51-60 YEARS	28	1	0	18	2	1	50
61-90 YEARS	3	1	0	18	2	3	27
TOTAL	114	9	10	96	43	12	284

Table 3.1.10: Distribution of the respondents by age groups according to the main trip purpose when riding a bike at Vestergade Vest and Mageløs.

Out of the Table 3.1.10, the SPSS calculated the Chi2 to be 98,443 with a degree of freedom (df) 20 and the missing values are 14. P is under 0,001. Therefore, the variables are dependent.

SOCIO-DEMOGRAPHICS AND FREQUENCY OF TRIPS TO THE MAIN PURPOSE

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
MALE	1	5	97	13	14	130
FEMALE	4	15	123	6	11	159
TOTAL	5	20	220	19	14	289

Table 3.1.11: Distribution of the respondents by gender according to the frequency they ride a bike at Vestergade Vest and Mageløs for the main purpose mentioned in the Figure 3.1.44, after the intervention at Vestergade Vest and Mageløs.

Out of the Table 3.1.11, the SPSS calculated the Chi2 to be 10,002 with a degree of freedom (df) 4 and the missing values are 9. P is between 0,050 and 0,025. Therefore, the variables are dependent.

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
PUBLIC SCHOOL	1	0	9	2	7	19
VOCATIONAL EDUC.	1	2	23	2	4	32
HIGH SCHOOL	0	5	23	7	5	40
SHORT HIGHER EDUC.	1	1	24	4	1	31
MEDIUM HIGHER EDUC.	1	8	88	3	5	105
LONG HIGHER EDUC.	1	4	53	1	3	62
TOTAL	5	20	220	19	25	289

Table 3.1.12: Distribution of the respondents by educational level according to the frequency they ride a bike at Vestergade Vest and Mageløs for the main purpose mentioned in the Figure 3.1.44, after the intervention at Vestergade Vest and Mageløs.

Out of the Table 3.1.12, the SPSS calculated the Chi2 to be 42,290 with a degree of freedom (df) 20 and the missing values are 9. P is between 0,005 and 0,001. Therefore, the variables are dependent.

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
01-20 YEARS	0	1	9	3	3	16
21-30 YEARS	2	8	78	13	3	104
31-40 YEARS	0	4	30	1	6	41
41-50 YEARS	3	3	35	1	3	45
51-60 YEARS	0	3	52	0	5	50
61-90 YEARS	0	1	23	0	3	27
TOTAL	5	20	217	18	23	283

Table 3.1.13: Distribution of the respondents by age groups according to the frequency they ride a bike at Vestergade Vest and Mageløs for the main purpose mentioned in the Figure 3.1.44, after the intervention at Vestergade Vest and Mageløs.

Out of the Table 3.1.13, the SPSS calculated the Chi2 to be 36,728 with a degree of freedom (df) 20 and the missing values are 15. P is between 0,025 and 0,010. Therefore, the variables are dependent.

SOCIO-DEMOGRAPHICS AND SATISFACTION WITH VESTERGADE VEST AND MAGELØS

	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	13	25	31	43	18	130
FEMALE	13	56	31	54	5	159
TOTAL	26	81	62	97	23	289

Table 3.1.14: Distribution of the respondents by gender according to the level of satisfaction with the design of Vestergade Vest and Mageløs.

Out of the Table 3.1.14, the SPSS calculated the Chi2 to be 17,729 with a degree of freedom (df) 4 and the missing values are 9. P is close to 0,001. Therefore, the variables are dependent.

	VERY DIS-SATISFIED	DIS-SATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	3	4	5	3	4	19
VOCATIONAL EDUC.	2	8	13	8	1	32
HIGH SCHOOL	3	8	9	15	5	40
SHORT HIGHER EDUC.	3	10	4	10	3	30
MEDIUM HIGHER EDUC.	10	28	20	40	7	105
LONG HIGHER EDUC.	6	22	11	20	4	63
TOTAL	27	80	62	97	23	289

Table 3.1.15: Distribution of the respondents by educational level according to the level of satisfaction with the design of Vestergade Vest and Mageløs.

Out of the Table 3.1.15, the SPSS calculated the Chi2 to be 18,036 with a degree of freedom (df) 20 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	2	4	6	4	16
21-30 YEARS	10	25	17	46	7	105
31-40 YEARS	6	12	7	14	2	41
41-50 YEARS	2	16	9	12	5	44
51-60 YEARS	7	17	14	9	3	50
61-90 YEARS	2	7	8	8	2	27
TOTAL	27	79	59	98	23	283

Table 3.1.16: Distribution of the respondents by age groups according to the level of satisfaction with the design of Vestergade Vest and Mageløs.

Out of the Table 3.1.16, the SPSS calculated the Chi2 to be 27,435 with a degree of freedom (df) 20 and the missing values are 15. P is between 0,250 and 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE IMPACT OF VESTERGADE VEST AND MAGELØS` DESIGN ON SAFETY

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	14	38	28	39	11	130
FEMALE	40	54	33	24	7	158
TOTAL	54	92	61	63	18	288

Table 3.1.17: Distribution of the respondents by gender according to their opinion about how the Vestergade Vest and Mageløs` design fulfilled the bicyclist safety aspect.

Out of the Table 3.1.17, the SPSS calculated the Chi2 to be 17,616 with a degree of freedom (df) 4 and the missing values are 10. P is close to 0,001. Therefore, the variables are dependent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	1	7	3	5	3	19
VOCATIONAL EDUC.	5	15	6	4	2	32
HIGH SCHOOL	6	12	9	11	2	40
SHORT HIGHER EDUC.	9	10	5	6	1	31
MEDIUM HIGHER EDUC.	21	29	24	25	5	104
LONG HIGHER EDUC.	13	18	14	12	5	62
TOTAL	55	91	61	63	18	288

Table 3.1.18: Distribution of the respondents by educational level according to their opinion about how the Vestergade Vest and Mageløs` design fulfilled the bicyclist safety aspect.

Out of the Table 3.1.18, the SPSS calculated the Chi2 to be 14,899 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	5	5	5	1	16
21-30 YEARS	17	28	22	30	8	105
31-40 YEARS	11	13	5	9	3	41
41-50 YEARS	10	11	10	10	3	44
51-60 YEARS	12	22	11	4	0	49
61-90 YEARS	4	10	5	5	3	27
TOTAL	54	89	58	63	18	282

Table 3.1.19: Distribution of the respondents by age group according to their opinion about how the Vestergade Vest and Mageløs' design fulfilled the bicyclist safety aspect.

Out of the Table 3.1.19, the SPSS calculated the Chi2 to be 24,422 with a degree of freedom (df) 20 and the missing values are 16. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE IMPACT OF VESTERGADE VEST AND MAGELØS` DESIGN ON FAST CONNECTIVITY

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	12	23	39	43	12	129
FEMALE	20	37	43	49	9	158
TOTAL	32	60	82	92	21	287

Table 3.1.20: Distribution of the respondents by gender according to their opinion about how the Vestergade Vest and Mageløs' design fulfilled the fast connectivity.

Out of the Table 3.1.20, the SPSS calculated the Chi2 to be 3,386 with a degree of freedom (df) 4 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	2	6	8	1	17
VOCATIONAL EDUC.	5	8	9	5	5	32
HIGH SCHOOL	4	10	15	8	3	40
SHORT HIGHER EDUC.	8	7	5	10	1	31
MEDIUM HIGHER EDUC.	9	16	32	39	9	105
LONG HIGHER EDUC.	7	17	15	21	2	62
TOTAL	33	60	82	91	21	287

Table 3.1.21: Distribution of the respondents by educational level according to their opinion about how the Vestergade Vest and Mageløs` design fulfilled the fast connectivity.

Out of the Table 3.1.21, the SPSS calculated the Chi2 to be 18,694 with a degree of freedom (df) 20 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	5	7	1	3	16
21-30 YEARS	12	22	29	36	6	105
31-40 YEARS	4	10	10	16	1	41
41-50 YEARS	7	5	13	14	4	43
51-60 YEARS	6	13	13	15	3	50
61-90 YEARS	3	3	7	9	4	26
TOTAL	32	58	79	91	21	281

Table 3.1.22: Distribution of the respondents by age groups according to their opinion about how the Vestergade Vest`s design fulfilled the fast connectivity.

Out of the Table 3.1.22, the SPSS calculated the Chi2 to be 20,432 with a degree of freedom (df) 20 and the missing values are 17. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT VESTERGADE VEST AND MAGELØS AESTHETICS

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	5	20	41	49	15	130
FEMALE	11	22	55	58	12	158
TOTAL	16	42	96	107	27	288

Table 3.1.23: Distribution of the respondents by gender according to their opinion about how the Vestergade Vest and Mageløs' design fulfilled the aesthetics aspect.

Out of the Table 3.1.23, the SPSS calculated the Chi2 to be 2,781 with a degree of freedom (df) 4 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	3	5	8	2	18
VOCATIONAL EDUC.	4	3	10	12	3	32
HIGH SCHOOL	2	4	14	16	4	40
SHORT HIGHER EDUC.	2	8	10	11	0	31
MEDIUM HIGHER EDUC.	7	18	31	38	11	105
LONG HIGHER EDUC.	1	7	25	22	7	62
TOTAL	16	43	95	107	27	288

Table 3.1.24: Distribution of the respondents by educational level according to their opinion about how the Vestergade Vest and Mageløs' design fulfilled the aesthetics aspect.

Out of the Table 3.1.24, the SPSS calculated the Chi2 to be 15,938 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	1	6	5	4	16
21-30 YEARS	2	12	33	45	13	105
31-40 YEARS	3	6	17	13	2	41
41-50 YEARS	2	9	15	14	4	44
51-60 YEARS	7	12	13	17	1	50
61-90 YEARS	1	2	9	11	3	26
TOTAL	15	42	93	105	27	282

Table 3.1.25: Distribution of the respondents by age groups according to their opinion about how the Vestergade Vest and Mageløs' design fulfilled the aesthetics aspect.

Out of the Table 3.1.25, the SPSS calculated the Chi2 to be 29,745 with a degree of freedom (df) 20 and the missing values are 16. P is between 0,100 and 0,050. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT ILLEGALLY PARKED BICYCLES

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	71	38	11	6	4	130
FEMALE	65	66	13	9	5	158
TOTAL	136	104	24	15	9	288

Table 3.1.26: Distribution of the respondents by gender according to their opinion about how problematic illegal parking of bicycles is at Vestergade Vest and Mageløs.

Out of the Table 3.1.26, the SPSS calculated the Chi2 to be 6,016 with a degree of freedom (df) 4 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	9	7	2	1	0	19
VOCATIONAL EDUC.	15	11	2	4	0	32
HIGH SCHOOL	21	11	3	4	1	40
SHORT HIGHER EDUC.	13	8	6	1	3	31
MEDIUM HIGHER EDUC.	43	45	9	3	3	103
LONG HIGHER EDUC.	36	21	2	2	2	63
TOTAL	137	103	24	15	9	288

Table 3.1.27: Distribution of the respondents by educational level according to their opinion about how problematic illegal parking of bicycles is at Vestergade Vest and Mageløs.

Out of the Table 3.1.27, the SPSS calculated the Chi2 to be 25,507 with a degree of freedom (df) 20 and the missing values are 10. P is between 0,250 and 0,100. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	9	5	1	1	0	16
21-30 YEARS	60	37	4	2	2	105
31-40 YEARS	19	12	4	5	1	41
41-50 YEARS	30	17	4	1	3	45
51-60 YEARS	17	19	8	2	2	48
61-90 YEARS	8	12	3	3	1	27
TOTAL	133	102	24	14	9	282

Table 3.1.28: Distribution of the respondents by age groups according to their opinion about how problematic illegal parking of bicycles is at Vestergade Vest and Mageløs.

Out of the Table 3.1.28, the SPSS calculated the Chi2 to be 26,125 with a degree of freedom (df) 20 and the missing values are 16. P is between 0,250 and 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT CONFLICT BETWEEN DIFFERENT TRANSPORT MODES

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	15	37	27	21	28	128
FEMALE	13	39	26	35	46	159
TOTAL	28	76	53	56	74	287

Table 3.1.29: Distribution of the respondents by gender according to their opinion about how problematic is the conflict between different transport modes at Vestergade Vest and Mageløs.

Out of the Table 3.1.29, the SPSS calculated the Chi2 to be 4,800 with a degree of freedom (df) 4 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	4	7	4	0	4	19
VOCATIONAL EDUC.	3	11	5	6	7	32
HIGH SCHOOL	4	12	8	6	9	39
SHORT HIGHER EDUC.	2	7	5	3	14	31
MEDIUM HIGHER EDUC.	6	28	23	19	27	103
LONG HIGHER EDUC.	9	11	8	21	14	62
TOTAL	28	76	53	55	75	287

Table 3.1.30: Distribution of the respondents by educational level according to their opinion about how problematic is the conflict between different transport modes at Vestergade Vest and Mageløs.

Out of the Table 3.1.30, the SPSS calculated the Chi2 to be 29,319 with a degree of freedom (df) 20 and the missing values are 11. P is between 0,100 and 0,050. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	2	5	4	2	3	16
21-30 YEARS	13	25	17	22	26	103
31-40 YEARS	2	9	8	9	13	41
41-50 YEARS	3	12	8	9	13	45
51-60 YEARS	2	11	11	9	16	49
61-90 YEARS	6	10	5	3	3	27
TOTAL	28	72	53	54	74	281

Table 3.1.31: Distribution of the respondents by age groups according to their opinion about how problematic is the conflict between different transport modes at Vestergade Vest and Mageløs.

Out of the Table 3.1.31, the SPSS calculated the Chi2 to be 17,042 with a degree of freedom (df) 20 and the missing values are 17. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT OBSTACLES AGAINST CYCLISTS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	30	38	18	19	24	129
FEMALE	26	30	28	38	38	160
TOTAL	56	68	46	57	62	289

Table 3.1.32: Distribution of the respondents by gender according to their opinion about how problematic is the existence of obstacles against the cyclists at Vestergade Vest and Mageløs.

Out of the Table 3.1.32, the SPSS calculated the Chi2 to be 9,682 with a degree of freedom (df) 4 and the missing values are 9. P is between 0,050 and 0,025, but close to 0,050. The variables are independent. But with errors in the sample is p-value is so close that they may well be dependent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	4	6	5	2	2	19
VOCATIONAL EDUC.	6	13	2	5	5	31
HIGH SCHOOL	4	6	11	9	10	40
SHORT HIGHER EDUC.	5	8	2	4	12	31
MEDIUM HIGHER EDUC.	24	21	19	19	22	105
LONG HIGHER EDUC.	13	14	7	17	12	63
TOTAL	56	68	46	56	63	289

Table 3.1.33: Distribution of the respondents by educational level according to their opinion about how problematic is the existence of obstacles against the cyclists at Vestergade Vest and Mageløs.

Out of the Table 3.1.33, the SPSS calculated the Chi2 to be 28,844 with a degree of freedom (df) 20 and the missing values are 9. P is between 0,100 and 0,050. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	3	1	8	2	2	16
21-30 YEARS	18	23	20	27	17	105
31-40 YEARS	5	13	6	7	10	41
41-50 YEARS	12	9	5	7	11	44
51-60 YEARS	5	10	6	11	18	50
61-90 YEARS	12	8	1	2	4	24
TOTAL	55	64	46	56	62	283

Table 3.1.34: Distribution of the respondents by age groups according to their opinion about how problematic is the existence of obstacles against the cyclists at Vestergade Vest and Mageløs.

Out of the Table 3.1.34, the SPSS calculated the Chi2 to be 46,279 with a degree of freedom (df) 20 and the missing values are 15. P is smaller than 0,001. Therefore, the variables are dependent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE PAVEMENT

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	79	29	8	11	3	130
FEMALE	86	47	11	3	8	155
TOTAL	165	76	19	14	11	286

Table 3.1.35: Distribution of the respondents by gender according to their opinion about how problematic is the pavement at Vestergade Vest and Mageløs.

Out of the Table 3.1.35, the SPSS calculated the Chi2 to be 9,760 with a degree of freedom (df) 5 and the missing values are 13. P is between 0,050 and 0,025, but close to 0,050. The variables are independent. But with errors in the sample is p-value is so close that they may well be dependent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	11	5	2	0	0	18
VOCATIONAL EDUC.	16	12	2	1	1	32
HIGH SCHOOL	27	8	1	3	1	40
SHORT HIGHER EDUC.	18	6	1	2	1	28
MEDIUM HIGHER EDUC.	59	29	8	4	5	105
LONG HIGHER EDUC.	34	16	4	4	3	61
TOTAL	165	76	18	14	11	284

Table 3.1.36 : Distribution of the respondents by educational level according to their opinion about how problematic is the pavement at Vestergade Vest and Mageløs.

Out of the Table 3.1.36, the SPSS calculated the Chi2 to be 9,739 with a degree of freedom (df) 20 and the missing values are 14. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	13	2	0	1	0	16
21-30 YEARS	61	30	7	5	1	104
31-40 YEARS	25	8	1	4	3	41
41-50 YEARS	24	11	5	1	3	44
51-60 YEARS	25	15	4	1	4	49
61-90 YEARS	13	8	2	1	0	24
TOTAL	160	75	19	13	11	278

Table 3.1.37: Distribution of the respondents by age groups according to their opinion about how problematic is the pavement at Vestergade Vest and Mageløs.

Out of the Table 3.1.37, the SPSS calculated the Chi2 to be 19,106 with a degree of freedom (df) 20 and the missing values are 20. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT CRACKS IN RAMPS AND INTERSECTIONS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	67	39	11	6	6	129
FEMALE	67	42	22	16	12	159
TOTAL	137	81	33	22	18	288

Table 3.1.38: Distribution of the respondents by gender according to their opinion about how problematic is the existence of cracks and ramps at Vestergade Vest and Mageløs.

Out of the Table 3.1.38, the SPSS calculated the Chi2 to be 7,277 with a degree of freedom (df) 4 and the missing values are 10. P is between 0,250 and 0,100, but very close to 0,100. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	12	4	2	0	1	19
VOCATIONAL EDUC.	13	12	3	4	0	32
HIGH SCHOOL	21	10	4	3	2	40
SHORT HIGHER EDUC.	16	7	3	2	2	30
MEDIUM HIGHER EDUC.	42	31	15	8	8	104
LONG HIGHER EDUC.	30	17	6	5	5	63
TOTAL	134	81	33	22	18	288

Table 3.1.39: Distribution of the respondents by educational level according to their opinion about how problematic is the existence of cracks and ramps at Vestergade Vest and Mageløs.

Out of the Table 3.1.39, the SPSS calculated the Chi2 to be 11,216 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	11	3	0	1	1	16
21-30 YEARS	51	28	15	6	4	104
31-40 YEARS	19	14	1	4	3	41
41-50 YEARS	18	14	3	5	5	245
51-60 YEARS	21	11	8	4	5	49
61-90 YEARS	10	10	6	1	0	27
TOTAL	130	80	33	21	18	282

Table 3.1.40: Distribution of the respondents by age groups according to their opinion about how problematic is the existence of cracks and ramps at Vestergade Vest and Mageløs.

Out of the Table 3.1.40, the SPSS calculated the Chi2 to be 23,000 with a degree of freedom (df) 20 and the missing values are 16. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT AWARENESS OF PEDESTRIANS AND MOTORIZED VEHICLE DRIVERS FOR CYCLISTS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	18	36	25	22	29	130
FEMALE	11	36	35	30	46	158
TOTAL	38	72	60	52	75	288

Table 3.1.41: Distribution of the respondents by gender according to their opinion about how problematic is the lack of awareness of pedestrians and motorized vehicle drivers for people riding a bike at Vestergade Vest and Mageløs.

Out of the Table 3.1.41, the SPSS calculated the Chi2 to be 5,773 with a degree of freedom (df) 4 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	1	8	3	3	4	19
VOCATIONAL EDUC.	3	11	5	6	7	32
HIGH SCHOOL	3	7	11	9	10	40
SHORT HIGHER EDUC.	1	6	8	6	9	30
MEDIUM HIGHER EDUC.	14	27	23	15	25	104
LONG HIGHER EDUC.	7	13	10	13	20	63
TOTAL	27	72	60	52	75	288

Table 3.1.42: Distribution of the respondents by educational level according to their opinion about how problematic is the lack of awareness of pedestrians and motorized vehicle drivers for people riding a bike at Vestergade Vest and Mageløs.

Out of the Table 3.1.42, the SPSS calculated the Chi2 to be 14,302 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	2	2	4	7	1	16
21-30 YEARS	12	23	22	18	30	105
31-40 YEARS	5	11	8	4	13	41
41-50 YEARS	4	12	10	8	11	45
51-60 YEARS	3	12	11	9	13	48
61-90 YEARS	3	10	4	4	6	27
TOTAL	29	70	59	50	74	282

Table 3.1.43: Distribution of the respondents by age groups according to their opinion about how problematic is the lack of awareness of pedestrians and motorized vehicle drivers for people riding a bike at Vestergade Vest and Mageløs.

Out of the Table 3.1.43, the SPSS calculated the Chi2 to be 16,197 with a degree of freedom (df) 20 and the missing values are 16. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT SIGNPOSTING AND ITS INTERPRETATION

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	64	21	14	12	19	130
FEMALE	46	40	25	18	31	160
TOTAL	110	61	38	30	50	290

Table 3.1.44: Distribution of the respondents by gender according to their opinion about how problematic is signposting and its interpretation at Vestergade Vest and Mageløs.

Out of the Table 3.1.44, the SPSS calculated the Chi2 to be 13,083 with a degree of freedom (df) 4 and the missing values are 8. P is very close to på 0,010. Therefore, the variables are dependent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	9	5	2	2	1	19
VOCATIONAL EDUC.	6	12	4	5	5	32
HIGH SCHOOL	15	9	4	1	11	40
SHORT HIGHER EDUC.	10	6	2	6	7	31
MEDIUM HIGHER EDUC.	42	22	17	10	14	105
LONG HIGHER EDUC.	28	7	10	6	12	63
TOTAL	110	61	39	30	50	290

Table 3.1.45: Distribution of the respondents by educational level according to their opinion about how problematic is signposting and its interpretation at Vestergade Vest and Mageløs.

Out of the Table 3.1.45, the SPSS calculated the Chi2 to be 25,951 with a degree of freedom (df) 20 and the missing values are 10. P is between 0,250 and 0,100. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	8	3	2	1	2	16
21-30 YEARS	47	18	12	12	16	105
31-40 YEARS	15	5	7	3	11	41
41-50 YEARS	14	8	10	4	9	45
51-60 YEARS	14	5	3	8	10	50
61-90 YEARS	9	9	5	2	2	27
TOTAL	107	58	39	30	50	284

Table 3.1.46: Distribution of the respondents by age groups according to their opinion about how problematic is signposting and its interpretation at Vestergade Vest and Mageløs.

Out of the Table 3.1.46, the SPSS calculated the Chi2 to be 23,288 with a degree of freedom (df) 20 and the missing values are 14. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT SCENIC

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	72	26	13	8	10	129
FEMALE	74	44	22	11	6	157
TOTAL	146	70	35	19	16	286

Table 3.1.47: Distribution of the respondents by gender according to their opinion about how problematic is the scenic at Vestergade Vest and Mageløs.

Out of the Table 3.1.47, the SPSS calculated the Chi2 to be 8,164 with a degree of freedom (df) 4 and the missing values are 10. P is between 0,100 and 0,050. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	12	4	1	2	0	19
VOCATIONAL EDUC.	16	8	2	3	3	32
HIGH SCHOOL	24	11	2	1	2	40
SHORT HIGHER EDUC.	15	4	7	1	3	30
MEDIUM HIGHER EDUC.	46	30	18	7	4	105
LONG HIGHER EDUC.	34	12	5	5	4	60
TOTAL	147	67	35	19	16	286

Table 3.1.48: Distribution of the respondents by educational level gender according to their opinion about how problematic is the scenic at Vestergade Vest and Mageløs.

Out of the Table 3.1.48, the SPSS calculated the Chi2 to be 13,169 with a degree of freedom (df) 20 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	11	4	1	0	0	16
21-30 YEARS	57	25	8	8	5	103
31-40 YEARS	20	12	3	1	5	41
41-50 YEARS	25	9	6	3	2	45
51-60 YEARS	20	9	13	4	3	49
61-90 YEARS	12	10	3	1	0	26
TOTAL	146	69	34	17	15	280

Table 3.1.49: Distribution of the respondents by age groups according to their opinion about how problematic is the scenic at Vestergade Vest and Mageløs.

Out of the Table 3.1.49, the SPSS calculated the Chi2 to be 21,015 with a degree of freedom (df) 20 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND BIKING MORE OFTEN AFTER VESTERGADE VEST AND MAGELØS` OPENING

	YES	NO	TOTAL
MALE	14	115	129
FEMALE	5	155	160
TOTAL	19	270	289

Table 3.1.50: Distribution of the respondents by gender based on starting to ride a bike more often, or not, after the opening of Vestergade Vest and Mageløs.

Out of the Table 3.1.50, the SPSS calculated the Chi2 to be 6,944 with a degree of freedom (df) 1 and the missing values are 9. P is very close to 0,010. Therefore, the variables are dependent.

	YES	NO	TOTAL
PUBLIC SCHOOL	3	16	19
VOCATIONAL EDUC.	2	30	32
HIGH SCHOOL	9	31	40
SHORT HIGHER EDUC.	1	30	31
MEDIUM HIGHER EDUC.	3	101	104
LONG HIGHER EDUC.	1	62	63
TOTAL	19	270	289

Table 3.1.51: Distribution of the respondents by educational level based on starting to ride a bike more often, or not, after the opening of Vestergade Vest and Mageløs.

Out of the Table 3.1.51, the SPSS calculated the Chi2 to be 24,571 with a degree of freedom (df) 5 and the missing values are 9. P is smaller than 0,001. Therefore, the variables are dependent.

	YES	NO	TOTAL
01-20 YEARS	5	11	16
21-30 YEARS	9	96	105
31-40 YEARS	2	38	40
41-50 YEARS	1	44	45
51-60 YEARS	2	48	50
61-90 YEARS	0	27	27
TOTAL	19	264	283

Table 3.1.52: Distribution of the respondents by age groups based on starting to ride a bike more often, or not, after the opening of Vestergade Vest and Mageløs.

Out of the Table 3.1.52, the SPSS calculated the Chi2 to be 20,127 with a degree of freedom (df) 5 and the missing values are 10. P is between 0,005 and 0,001, but very close to 0,001. Therefore, the variables are dependent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT STREET DESIGN AS INFLUENTIAL FACTOR TO RIDE A BIKE

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
MAN	38	20	37	26	7	128
FEMALE	31	45	37	31	13	157
TOTAL	69	65	74	57	20	285

Table 3.1.53: Distribution of respondents by gender according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.1.53, the SPSS calculated the Chi2 to be 9,714 with a degree of freedom (df) 4 and the missing values are 13. P is between 0,100 and 0,050. But very close to 0,050. Therefore, the variables are independent.

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
PUBLIC SCHOOL	6	4	4	3	2	19
VOCATIONAL EDUC.	7	7	5	9	3	31
HIGH SCHOOL	15	4	7	11	3	40
SHORT HIGHER EDUC.	6	10	9	4	2	31
MEDIUM HIGHER EDUC.	22	22	34	22	5	105
LONG HIGHER EDUC.	13	19	14	8	5	59
TOTAL	13	19	14	8	5	285

Table 3.1.54: Distribution of respondents by educational level according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.1.54, the SPSS calculated the Chi2 to be 21,295 with a degree of freedom (df) 20 and the missing values are 13. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	2	5	8	1	16
21-30 YEARS	2	11	51	34	6	104
31-40 YEARS	0	9	18	14	0	41
41-50 YEARS	4	11	18	10	2	45
51-60 YEARS	4	14	21	10	0	49
61-90 YEARS	3	3	14	7	0	27
TOTAL	13	50	127	83	9	282

Table 3.1.55: Distribution of respondents by age groups according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.1.55, the SPSS calculated the Chi2 to be 32,059 with a degree of freedom (df) 20 and the missing values are 16. P is between 0,050 and 0,025. Therefore, the variables are dependent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT VESTERGADE VEST AND MAGELØS DESIGN SOLUTION

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	3	19	60	43	4	129
FEMALE	10	32	72	40	5	159
TOTAL	13	51	132	83	9	288

Table 3.1.56: Distribution of respondents by gender according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Vestergade Vest and Mageløs.

Out of the Table 3.1.56, the SPSS calculated the Chi2 to be 5,326 with a degree of freedom (df) 5 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	1	4	8	4	2	19
VOCATIONAL EDUC.	3	5	15	9	0	32
HIGH SCHOOL	1	6	16	17	0	40
SHORT HIGHER EDUC.	3	8	12	8	0	31
MEDIUM HIGHER EDUC.	3	19	48	30	5	105
LONG HIGHER EDUC.	3	9	32	15	2	61
TOTAL	14	51	131	83	9	288

Table 3.1.57: Distribution of respondents by educational level according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Vestergade Vest and Mageløs.

Out of the Table 3.1.57, the SPSS calculated the Chi2 to be 18,201 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
01-20 YEARS	8	1	3	3	1	16
21-30 YEARS	23	20	26	28	7	104
31-40 YEARS	13	13	9	3	3	41
41-50 YEARS	12	9	13	7	3	44
51-60 YEARS	8	13	14	10	3	48
61-90 YEARS	4	7	8	5	3	27
TOTAL	68	63	73	56	20	280

Table 3.1.58: Distribution of respondents by age groups according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Vestergade Vest and Mageløs.

Out of the Table 3.1.58, the SPSS calculated the Chi2 to be 20,451 with a degree of freedom (df) 20 and the missing values are 18. P is bigger than 0,250. Therefore, the variables are independent.

Figure 3.1.62: Vestergade Vest streetscape.

3.2 case2
bicycle track hans broges gade

3.2.1 AARHUS

Aarhus is the second largest Danish municipality and had a population of 307.119 inhabitants in 2010 (Statistikbanken, 2010). The municipality is located in the east side of the peninsula named Jutland and it is part of the Central Jutland Region.

Figure 3.2.1: Geographical location of Aarhus.

MUNICIPALITY VISION

In the Municipal Plan 2009, Aarhus municipality announced its new vision as an environmental and energy sustainable city. Within its vision, there is a goal to become carbon neutral by the year 2030 (Aarhus Municipality, 2009b).

In order to achieve this goal, the Aarhus Traffic Plan aims to offer in the year 2030 this scenario:

“Aarhus Municipality`s infrastructure offers optimal conditions for both cyclists and the public transportation. Moreover, Aarhus municipality is known internationally as a bicycle city” ”(Aarhus Municipality, 2009b).

At the Aarhus Bicycle Action Plan 2007, six main focus areas for development of bike infrastructures are described. The major one is the development of a coherent bicycle network, making this network more permeable. Other focus areas are: to make road intersections more bike friendly, to improve safety conditions, to create more and better bicycle parking facilities, to optimize the combined use of cycling and public transport in order to expand the bicycle outreach and to improve dialog between cyclists and municipality (Aarhus Municipality, 2010a).

Differently from the municipalities of Copenhagen and Odense, Aarhus does not have a determined rate of cyclists to be achieved. According to the interview with Pablo Celis a civil engineer at Aarhus municipality, the Aarhus vision is to focus on a carbon neutral city and one of the main strategies for that is the increasing of the bike as transportation mode.

Aarhus Bicycle City functions as an umbrella for all the municipality initiatives in regards cycling – e.g. city bikes, campaigns and events to promote a bicycle culture. The Aarhus Bicycle City webpage – www.aarhuscykelby.dk – includes news about new bicycle projects, campaigns and a forum where people can make suggestions and proposals related to the Aarhus bike infrastructure.

On the 10th of April 2010, the Aarhus Bicycle City transformed the City Hall square in a “bicycle`s Mecca” where people could have diverse experiences with their bikes and also see different ways of experiencing cycling (Aarhus Cykelby, 2010a).

Inspired by the postal number of Aarhus – 8000 – another campaign launched by Aarhus municipality was the “8000 benefits of cycling”. Where 8000 citizens were asked about the benefits cycling brought to them. The results of the campaign are posted on the Aarhus Bicycle City webpage and there is also a movie in the internet about the campaign. Aarhus municipality has also implemented bicycle countings in the main bike corridors. The automatic cyclist counters and monitors are very informative and they are also used as an active element that inspires the population.

At the latest campaign, Aarhus Bicycle City promoted a competition between every street – with an automatic bicycle count installed with the winner being the one that increased the number of cyclists. The counting was made based on existing counts over a period of two weeks. Using already installed automated counters in the different neighbourhoods it was possible to register which of the neighbourhoods had the highest increase. The winning street was Hans Broges Gade. The street won the competition with an increase of 41% in the number of bicycle rides during the two weeks of the competition (Aarhus Stiftstidende, 2010).

Figure 3.2.2: Screen print of Aarhus Bicycle City webpage - www.aarhuscykelby.dk.

Figure 3.2.3: Automatic cyclist count at Hans Broges.

Figure 3.2.4: Aarhus City Hall square transformed in a “bicycle`s Mecca”. Event promoted by the Aarhus Bicycle City on the 10th of April 2010.
Source: Aarhus Municipality.

Figure 3.2.5: Aarhus City Hall square transformed in a the “bicycle`s Mecca”. Event promoted by the Aarhus Bicycle City on the 10th of April 2010.
Source: Aarhus Municipality.

BICYCLE NETWORK

Aarhus municipality has approximately 450 kilometres of bicycle tracks and lanes. Considering its 307.119 inhabitants (Danske Kommuner, 2009), Aarhus municipality has 1,46 metres of bicycle lanes and tracks per inhabitant. The Aarhus` rate of bicycle tracks and lanes per inhabitant is the double from Copenhagen and slightly smaller than Odense.

Aarhus has a coherent bicycle network plan which consists of seven bicycle routes linking the core of the city to the suburbs. The main focus has been to improve permeability and improvement of safety. It is expected to cost 100 million Danish krones to implement the plan (Aarhus Municipality, 2010a). From this amount, seventy million Danish crowns have been granted (Aarhus Municipality, 2010a).

Hans Broges Gade – our case study – is part of the Holme bicycle corridor which connects the suburbs of Holme to the core of Aarhus city. The entire improvement of the Holme corridor has a budget of 14 million Danish krones.

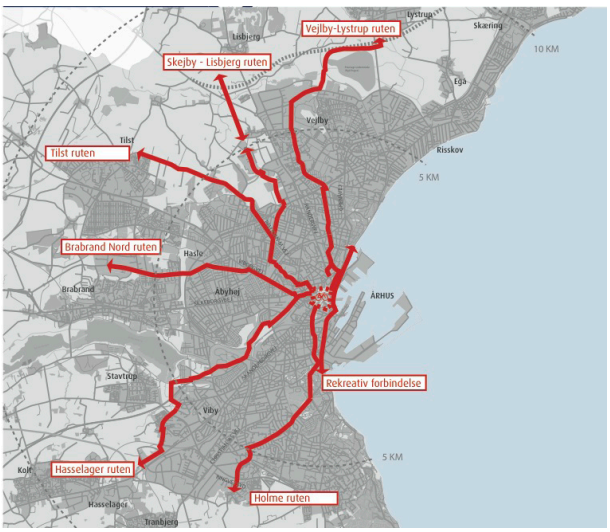


Figure 3.2.6: The seven main bicycle connections between the core of Aarhus and suburbs. Source: Cykelhandlingsplan – En plan for fremtidens cyklist forhold i Århus Kommune. Source: Aahus Municipality

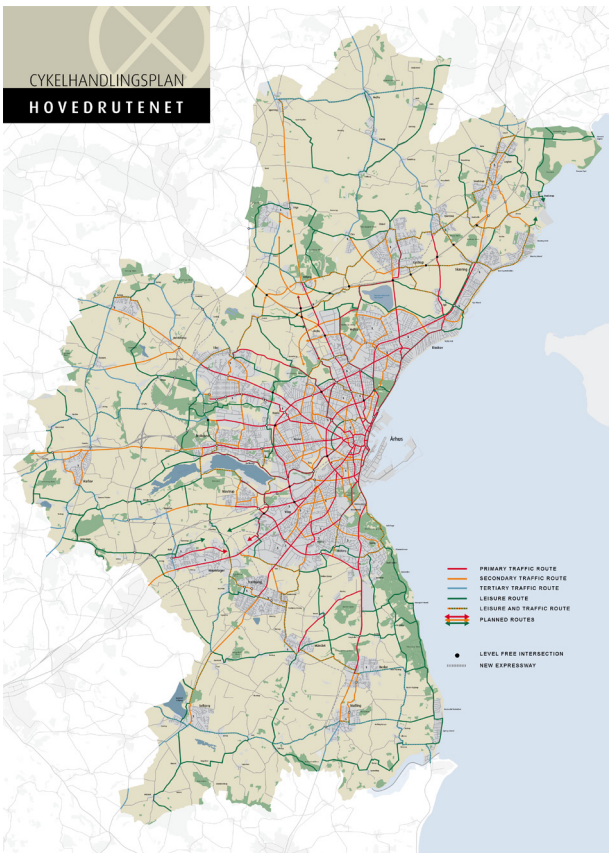


Figure 3.2.7: The bicycle network of Aarhus municipality.
Source: Aahus Municipality

Figure 3.2.8: Ortophoto of Hans Broges Gade. Modified from original picture from Google Earth

3.2.2 HANS BROGES GADE

Hans Broges Gade is located in the Aarhus inner city ring, in a dense neighbourhood composed by block structures up to five stories high from the early 20th century. The neighbourhood is on outskirts of the city and the majority of its buildings has residential use. However some buildings have mixed use where shops and offices are located in the ground floor.

In this scenario, the street functions as an important link between the suburbs and the core of the city. Moreover there is a pedestrian life from mostly local residents that use the local commerce.

The purpose of the intervention at Hans Broges Gade was to improve a bicycle route connecting southern suburbs of Holme to the centre of the city to become one of seven main bicycle corridors of the bicycle network plan.

BEFORE AND AFTER

Hans Broges Gade used to be a street with broad lanes for motorized vehicles and car parking facilities in both directions just next to the sidewalks. There were only bicycle tracks at the beginning of the street in the side facing Marcelis Boulevard for the first 100 metres. Along the rest of the street, cyclists had to ride their bikes on the outside of the rows of parked cars together motorized vehicles, especially busses.

With long blocks of up to 150 metres, cyclists with their bikes parked in the sidewalk had difficulty to access the road because of the row of parked cars. During the field observation several elderly residents mentioned it to be unsafe to walk on the sidewalks because cyclists preferred to ride their bikes on them, and consequently becoming unsafe for the pedestrians.

In order to give space to implement bicycle tracks in both directions of the street, one of the car parking rows was removed.

THE COSTS OF HANS BROGES GADE

The construction work of Hans Broges Gade was conducted between the 1st of December 2009 and the 15th of July 2010. The construction was delayed for several months due to a harsh winter and from road construction diggings for reinstalling main cables.

Aarhus municipality hired the counting firm for Grontmij Cal Bro to develop the project and manage the construction, consulting engineers for project design and construction management.

The overall cost of the project was 2,8 million Danish krones. At the project end maintenance became part of regular municipality maintenances with no costs specified.

After the opening, the maintenance costs of the infrastructure were estimated by the municipalities assumption costs and there is no information about specific costs.

Figure 3.2.9: Hans Broges Gade view before the intervention, in September 2009. Source: Google street view

Figure 3.2.10: Hans Broges Gade view after the intervention, in September 2010

DESIGN CHARACTERISTICS AND STREETSCAPE

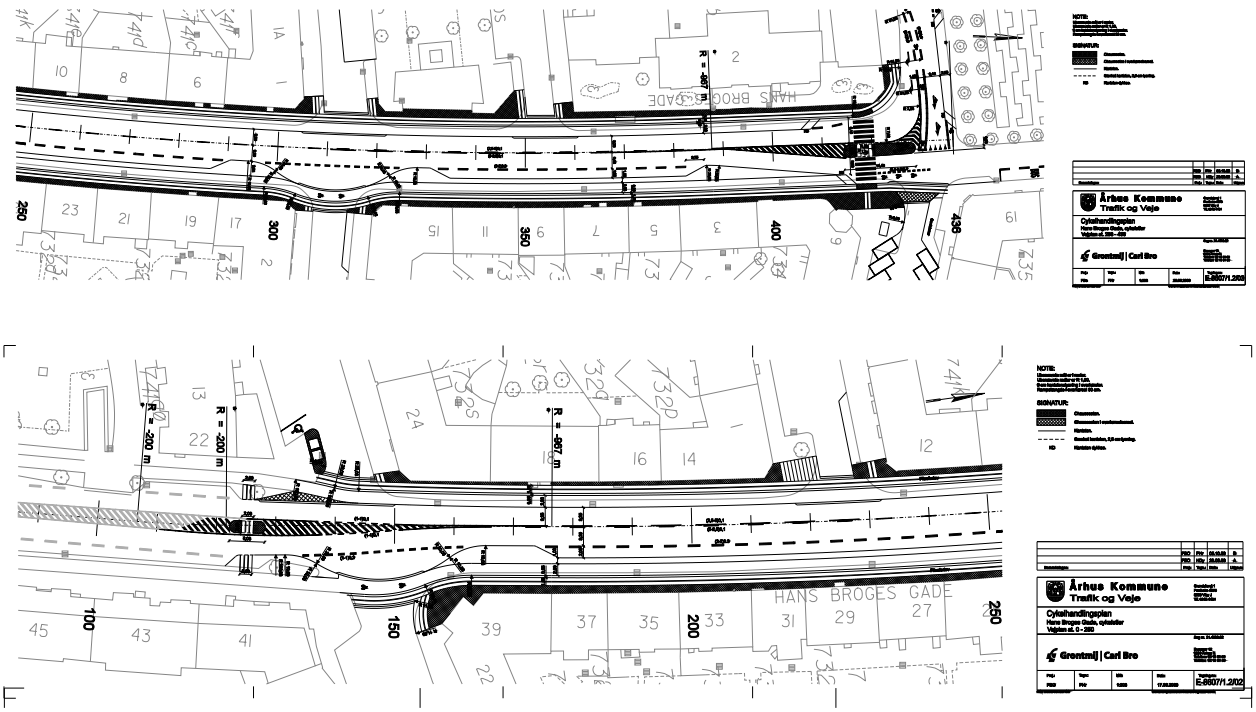
DESIGN CONCEPT

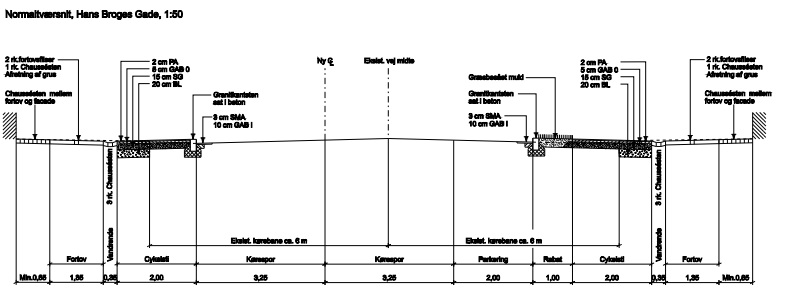
Han Broges Gade is part of the Holme corridor which links the city core to the Holme suburbs. The infrastructure aimed to improve biking conditions in the corridors. (Figure 3.2.11 and 3.2.12). The area is predominantly residential with some commercial buildings. The sidewalk has been divided into a shared space between bike parking, a pedestrian path, bike path and a grassed area which separates the bike path from the road where cars are parked. The street is around 430 metres long, and contains a garden square with some shops and residential apartments.

Figure 3.2.11 Hans Bro Gade bike path

Figure 3.2.12 Traffic calming at crossing.

TECHNICAL DRAWINGS





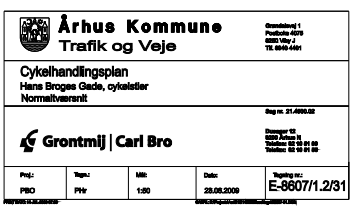


Figure 3.2.13 Technical drawings from Hans Bro Gade. Source: COWI.

SURFACE AND FLOW STRUCTURE

The flow of cyclists and pedestrians at Han Broges Gade is going in both directions on either side of the road. Looking south down the streetscape the sidewalk is divided into three spaces. Beginning from the building across there is a space for bike parking and shop signs. The pedestrian path lies directly next to the bike path divided by a small drainage gutter. The grass area separates cyclists from the parked cars and the street. On the opposite side of the street there is no car parking and no grass area dividing the cars from the cyclists (Figure 3.2.14 and 3.2.15).

The flow of traffic in the morning is quite busy as people are heading into the city for work or school. Cyclists are very eager to get to their destinations and understand how to navigate the bike path with other cyclists and on coming pedestians in the sidewalk next to them. The pedestrians walking on the sidewalk do not disturb the flow of cyclists. The cyclists have to navigate around the curved bend in the bike path which slows them down and makes them aware to look for cars passing over the bike path, however cars must give way to the flow of cyclists crossing the road. Complications can arise when the cars do not give way to the flow of cyclists therefore possibly

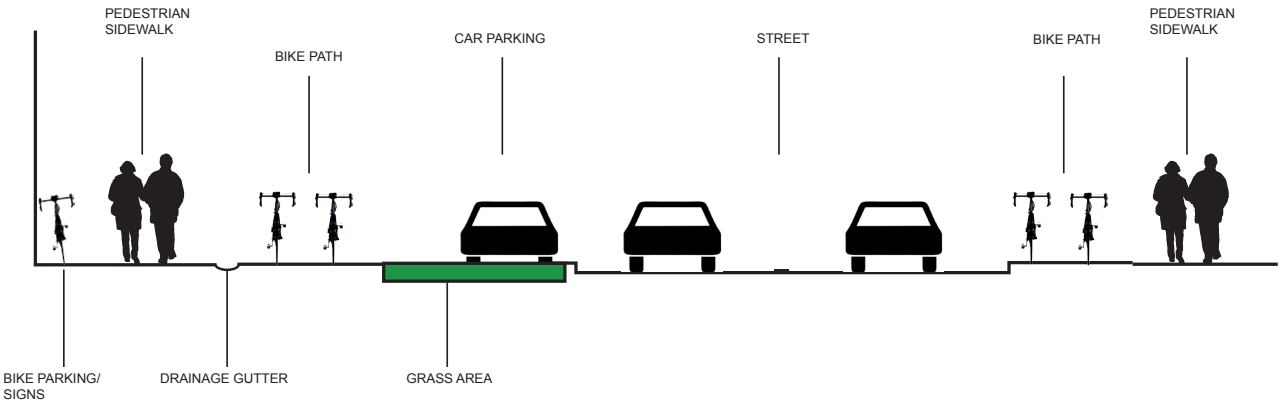


Figure 3.2.14: Hans Broges Gade section.

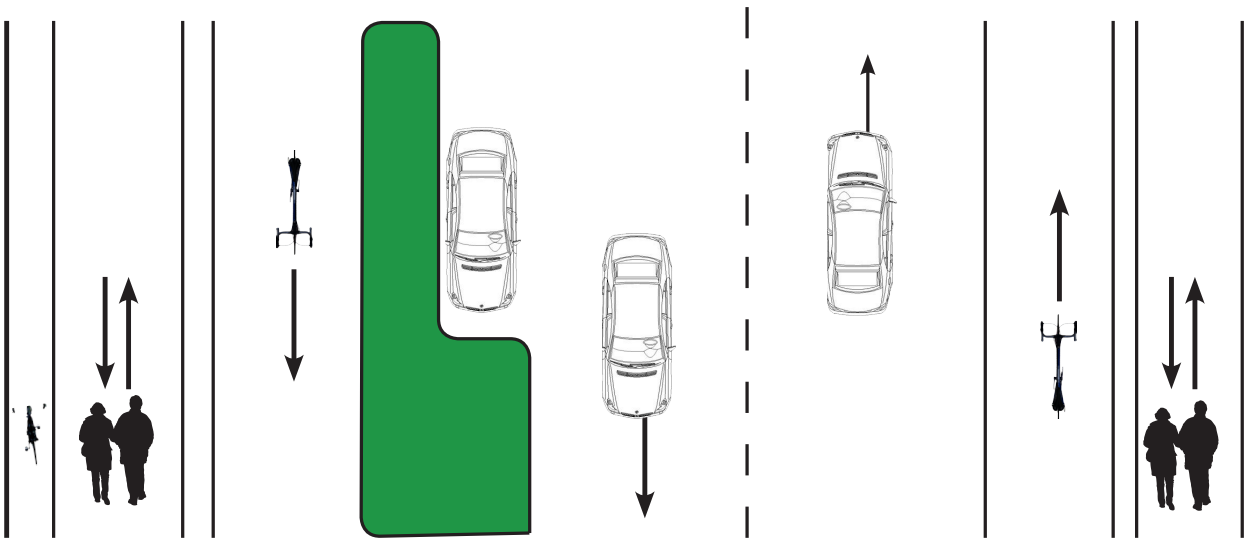


Figure 3.2.15: Hans Broges Gade plan.

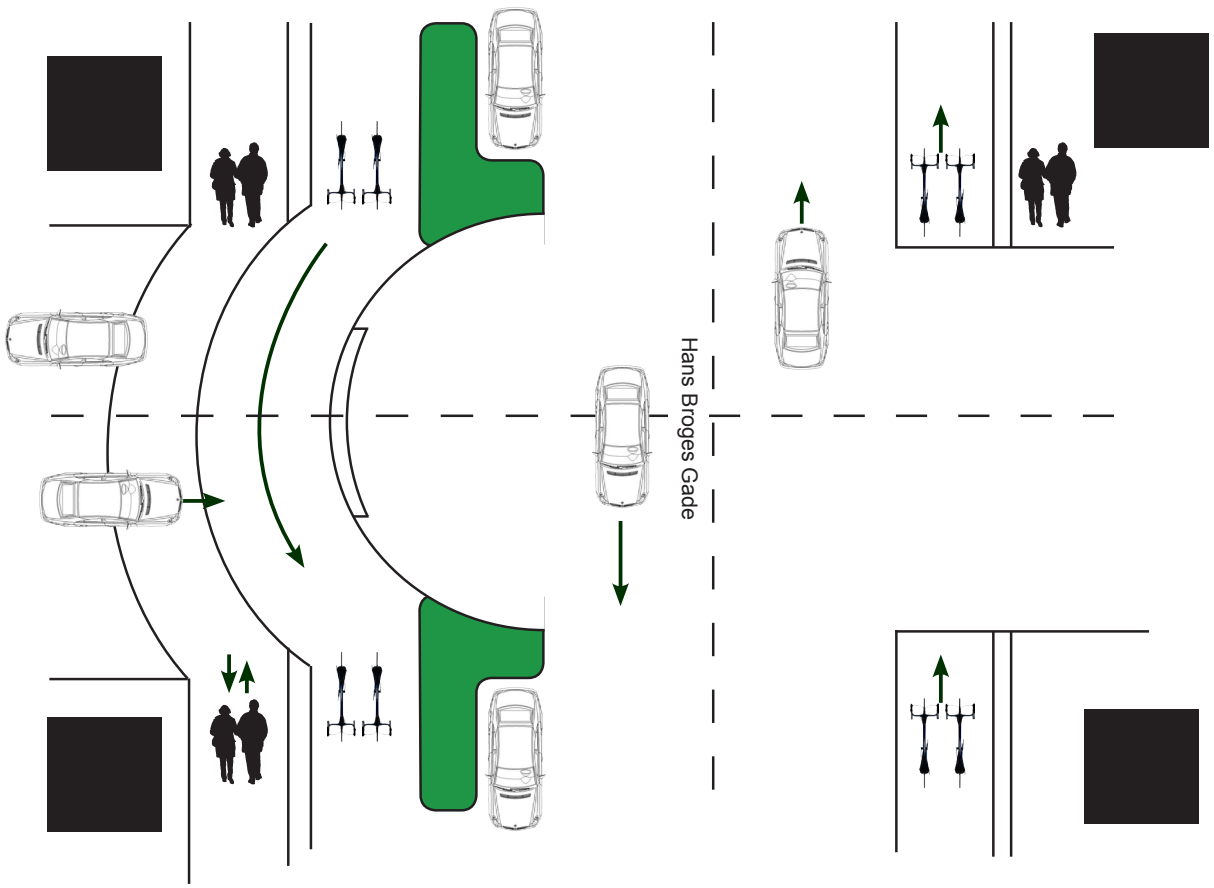


Figure 3.2.16: Crossing at Hans Broges Gade

PAVEMENT

The sidewalk and bike path is a combination of concrete tiles, stone tiles and asphalt. The sidewalks are a lighter colour in contrast to the dark bike path creating a clear division between the spaces. The sidewalks are divided by stone tiles separating pedestrians from each other.

To guide the cyclists in the correct lane a white symbol of a bike has been painted at the road crossings, which also alerts car drivers that this is a lane dedicated to cyclists (Figure 3.2.17 and 3.2.18). A small asphalt ramp has been applied to the gutter so the cars and cyclists can drive over the bike path and pedestrian sidewalk.

Figure 3.2.17: Bike path and sidewalk.

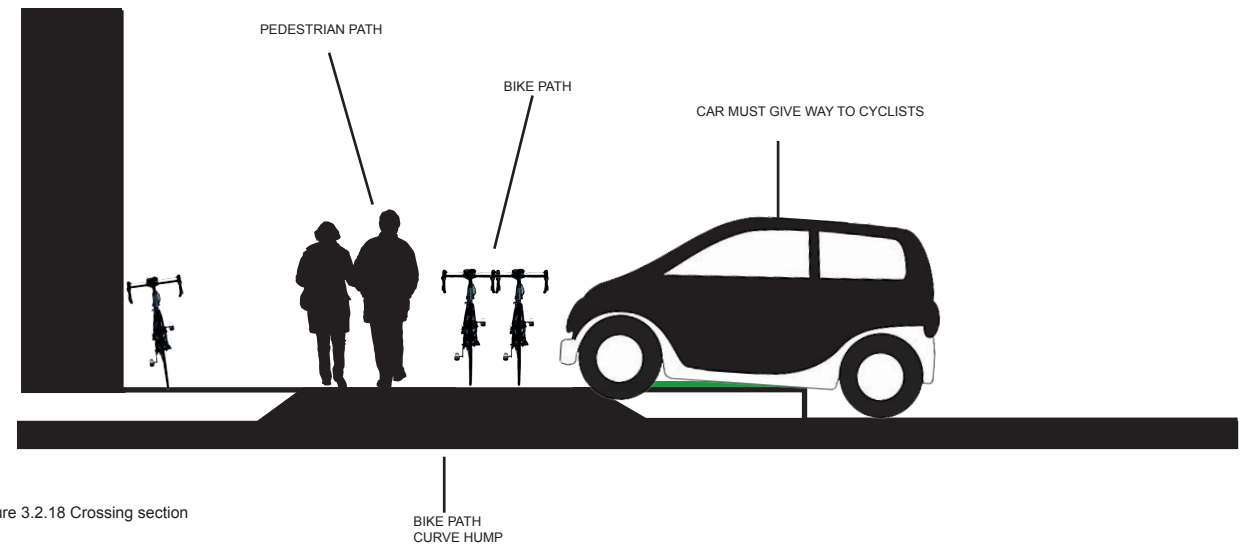


Figure 3.2.18 Crossing section

HIERARCHY OF USERS

The car needs to go up to the level of the cyclist to cross the cyclist path. The cyclist has priority for crossing the road therefore the car must give way to the in coming flow of cyclists and pedestrians (Figure 3.2.19).

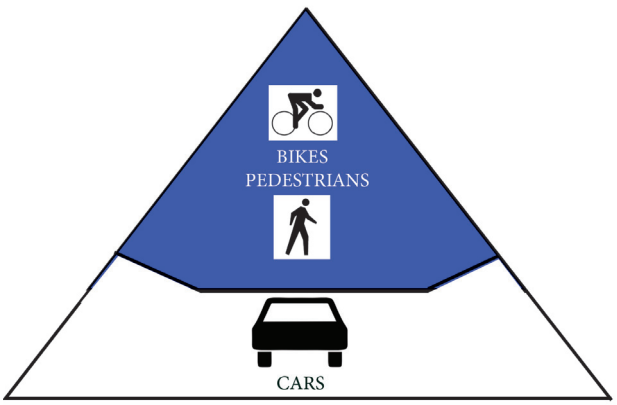


Figure 3.2.19: Hierarchy of transport modes

VELOCITIES

Since the bike path is solely dedicated to cyclists they can go quite fast, they are also able to ride comfortably next to each other while having a conversation see Figure 3.2.23. Hans Broges Gade has high and low peaks of traffic during the day. Peak hours where the bike path is most populated is in the morning from 7am to 10am when people are on their way to work or school. Other peak hours are in the afternoon/evening from 4pm till 7pm when people are on their way home from work and school. During these times it is more difficult for cyclists to go very fast as the bike path is more crowded. However during off peak times cyclists can go faster as there are less cyclists, these times are from 10am till 3pm, 7pm till 7am and on the weekends.

Cyclists can ride consistent speeds along the bike path however they must slow down at the curves in the path where they cross the side street (Figure 3.2.21 and 3.2.22). Walkers do not present any problems to the infrastructure as they are moving so slowly but they do have to pay a lot of attention to fast moving cyclists and cars at the intersections. Conflicts can arise when people are riding slowly or cyclists with kids that are riding slowly, this can become unsafe with fast riding cyclists that try to ride around them into the pedestrian path.

Figure 3.2.21: Cyclist riding down while entering the bike lane.

Figure 3.2.22: Cyclist slowing down at the crossing.

Figure 3.2.20: Individual riding his bike at a high speed

Figure 3.2.23: Two individuals riding their bikes next to each other and talking.

PARKING

Hans Broges Gade includes parking for bikes and cars. People tend to park their bikes along the front of residential buildings and shops. While cars have designated parks cut out of the greenery areas keeping them well organised into the streetscape (Figures 3.2.24 and 3.2.25). There is no car parking on the other side of the road.

Figure 3.2.24: Car parking at Hans Broges Gade.

Figure 3.2.25: Bike and car parking.

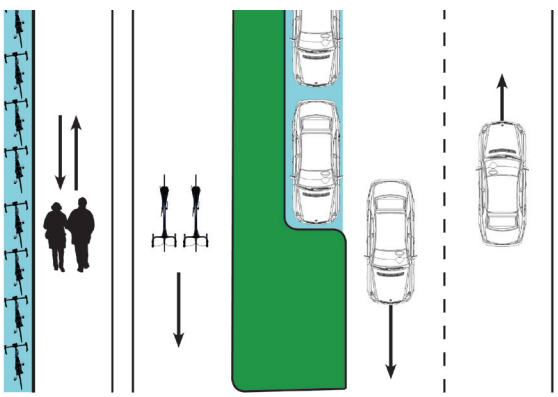


Figure 3.2.26: Hans Broges Gade plan.

TREES AND LANDSCAPING DESIGN

The area along Hans Broges Gade is sprinkled with two small areas of garden landscape. The first is a triangular garden that sits above a car park servicing a block of apartments (Figure 3.2.28). The second is a pretty garden square that houses rows of trees in a concrete paved landscape (Figure 3.2.27 and 3.2.29). Bordering the bike path and the street is a strip of grassed area separating the cyclists from the street. However on the opposite side of the street there is no grass strip.

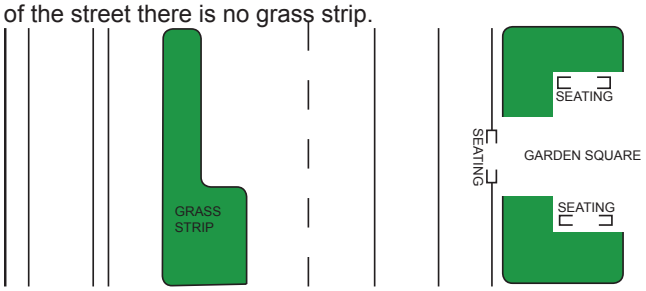


Figure 3.2.27: Greenery at Hans Broges Gade.

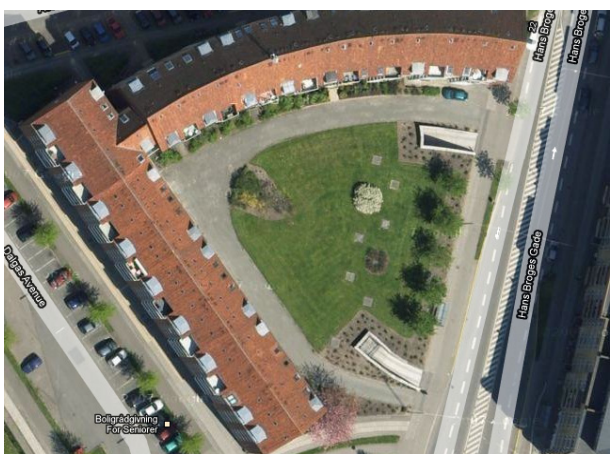


Figure 3.2.28: Front garden at Hans Broges Gade.

Figure 3.2.29: Tietgens Square.

STREET FURNITURE

There are a few pieces of street furniture in the area. They are all chairs and reside in front of and in the garden square (Figure 3.2.30).

Figure 3.2.30: Bench at Tietgens Square.

STREET LIGHTS

Lamps hang above the middle of the road (Figure 3.2.31).

Figure 3.2.31: Street lamp.

PUBLIC ART

At the Tietgens Square stands a statue in honor to Hans Broge. Hans Broges Gade was opened in 1901 and named after the renowned merchant and city counciler Hans Broge (1822-1908) (Figure 3.2.32).

Figure 3.2.32: Statue in honor to Han Broge.

SIGNAGE

Signage includes the counting meter which calculates the amount of cyclists that travel on the bike path (Figure 3.2.33). There are a few car parking signs indicating when and where you can park your car.

Other signage includes the bike symbol on the bike path itself and at the areas where cyclists can cross the road (Figure 3.2.34). However the bike symbol is visually not evident enough as you see below in Figure 3.2.35 and 3.2.36 a car has parked over the bike symbol and at the same time blocking the bike ramp where cyclists can cross. The bike symbol is also located at the curved crossing as you can see in Figure 3.2.37.

Figure 3.2.33: Cyclist counting meter


Figure 3.2.34: Bike signage.

Figure 3.2.35: Car covering bike signage

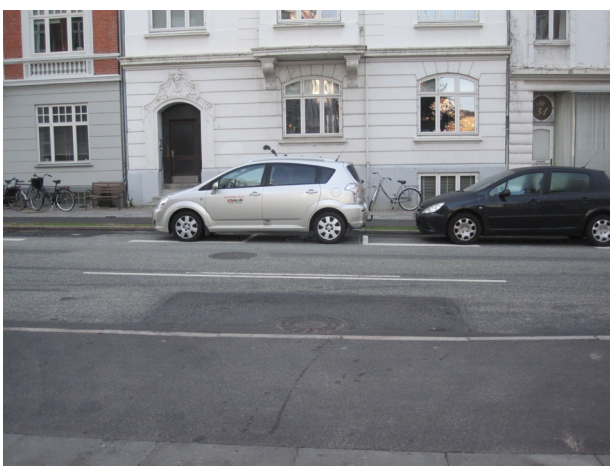


Figure 3.2.36: Car covering bike signage

Figure 3.2.37: Bike symbol located on the bike path curve and intersection

CROSSINGS, INTERSECTIONS

There are a few crossings and intersections that cyclists must navigate to ensure a safe ride. These include the main entrance where the path begins and the curved intersections which act as a bridge over the side streets. Also the small bike ramps which enable cyclists to leave the path and cross the road.

As previously discussed cyclists must be weary of cars passing through the bike path even though the cyclist has priority when crossing the path. A big problem as discussed in signage is when cars park over the bike symbol making it difficult for the cyclist to cross the road as he can not see the bike ramp or the bike symbol (Figure 3.2.38). Also sometimes there are no ramps for cyclists to cross therefore they are not even able to cross the road, this leads to cyclists riding up the wrong side of the road. The Figure 3.2.39 highlights a few problems where there is either no signage or the signage and ramp has been covered by parked cars.

Other problems include locating the ramp on the curved path only in the middle, as cyclists then have to always ride back into the half circle to enter the bike path and turn left. This leads to cyclists taking short cuts and riding up the road instead (see Figure 3.2.40).

Figure 3.2.38: Bike signage and ramp covered and cyclist crossing in an alternative way

Figure 3.2.39: Sequency of images of a cyclist crossing the street in an inappropriate way.

Figure 3.2.40 Cyclist riding his bike in the car lane

Figure 3.2.41: Cyclist riding his bike in the sidewalk.

ACCESSIBILITY

To access the new bike path coming from the suburbs you must cross a main road at the southern end of Hans Broges Gade then enter the bike path (Figure 3.2.42). The bike path also has multiple access points via side streets horizontally conversing over the bike path. At the end of Hans Broges Gade in the direction of the city, the bike path is at the northern end where it dissovles into the road (FIgure 3.2.43).

Figure 3.2.42: Cyclists entering from the suburbs.

Figure 3.2.43: Entrance form the city centre

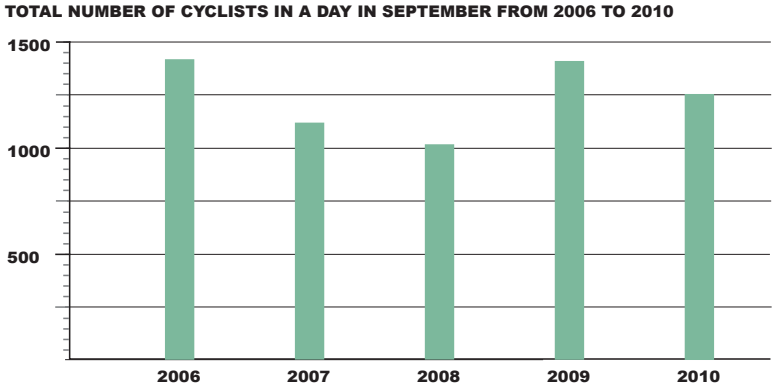
BUILT ENVIRONMENT AND USE

The street was constructed with a light curve which was one of the major ideas under the concept of creating a more diverse streetscape and living experience. The plan of the street thereby rejects the monotony that was part of the landscape at that time The surrounding area around Hans Broges Gade mostly consists of residential apartments with some commercial business centers with some parks and gardens scattered in between them. Hans Broges Gade acts as a main traffic corridor filtering a flow of cars, cyclists and pedestrians into the core of the city. (Figure 3.2.44).

The planned effect of greater diversity becomes visible when passing through the street. The curved facade line limits the visibility, but when moving through the street new perspectives gradually open up to new experiences.

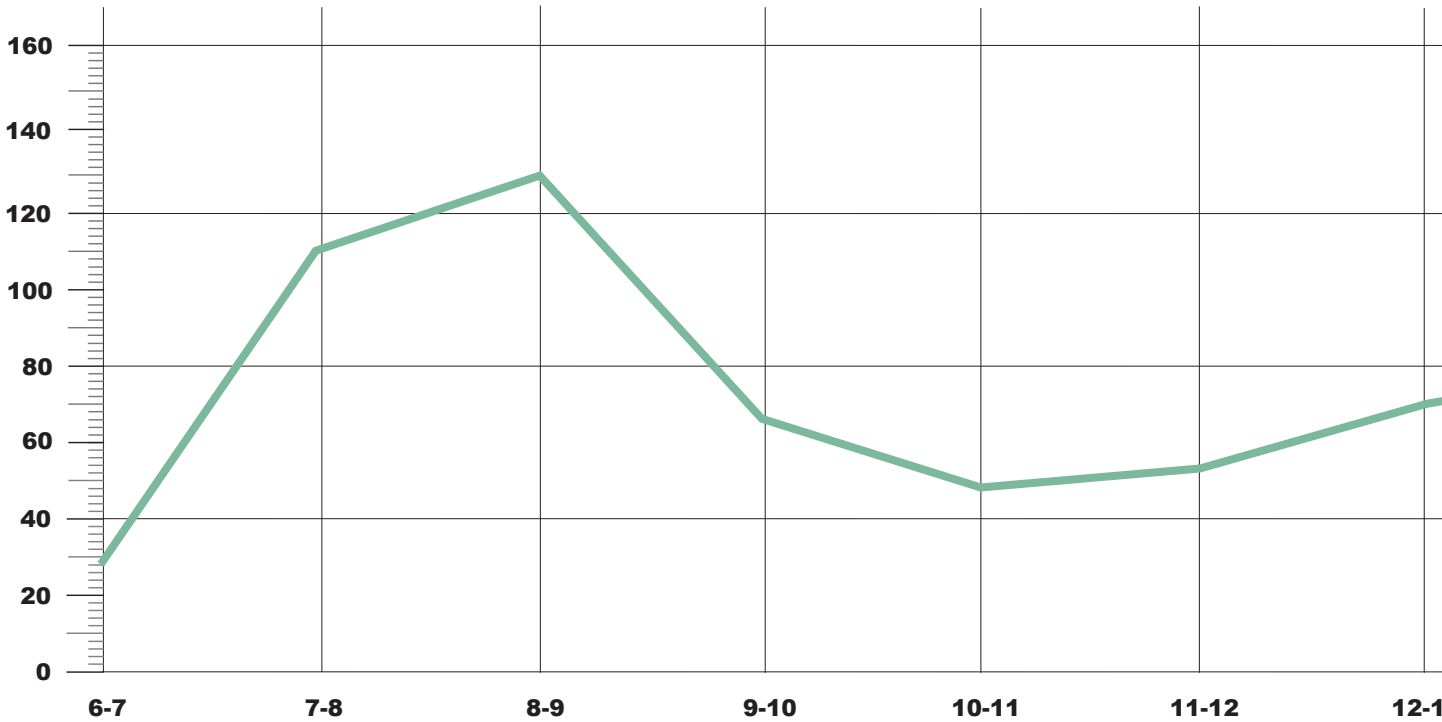
The majority of the buildings at Hans Broges Gade is four stores and which were erected between 1900 and 1910. Most of the buildings are designed with facade details-incorporating bay windows together with corner towers and spines.

Figure 3.2.44: Built environment at Hans Broges Gade.



CYCLIST COUNTINGS

NUMBER OF CYCLISTS



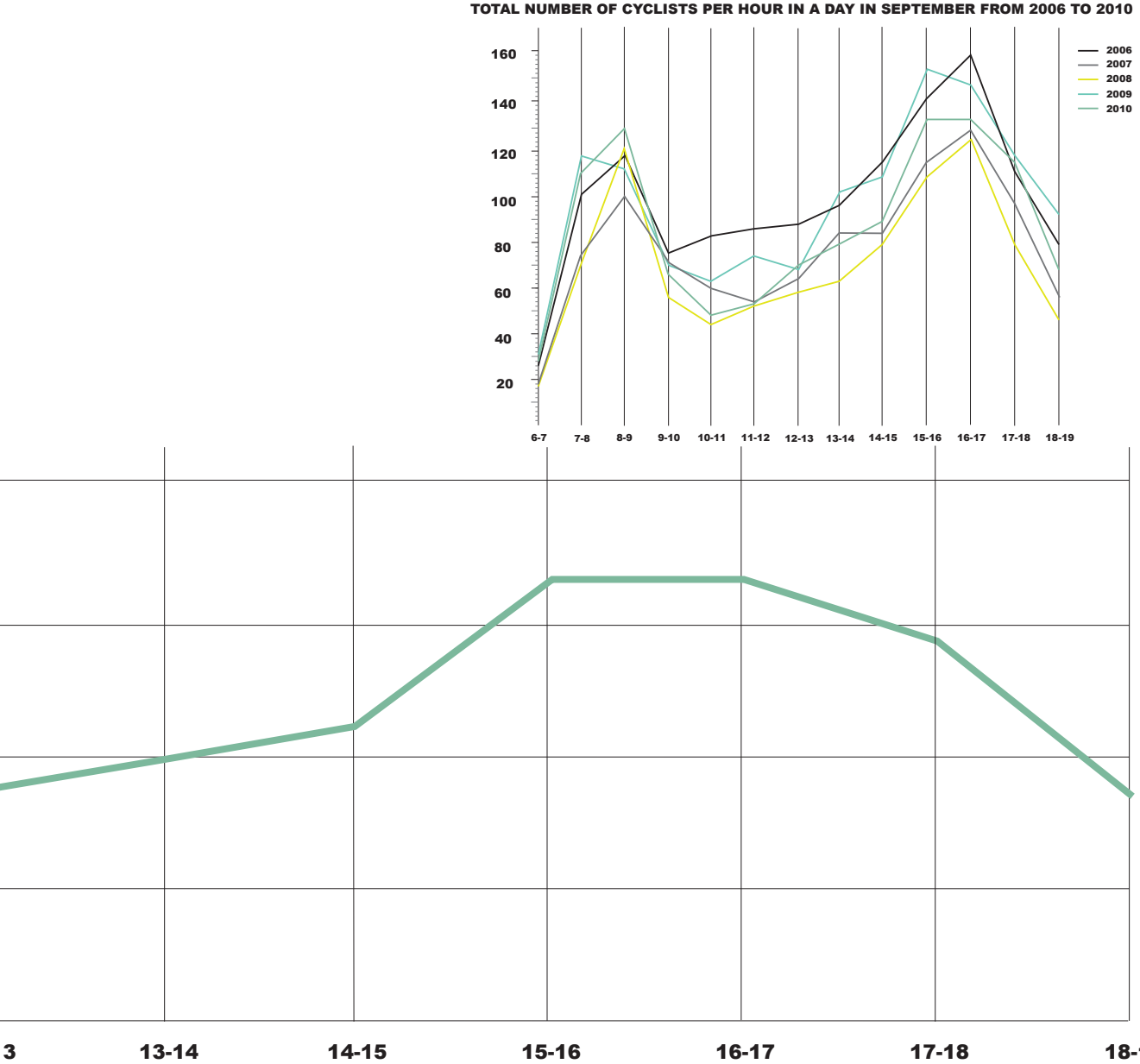
6-7
30 Bikes

8-9
130 Bikes

11-12
60 Bikes

Figure 3.2.45: Cyclist countings at Hans Broges Gade
Source: Aarhus municipality

TOTAL NUMBER OF CYCLISTS PER HOUR IN A DAY IN SEPTEMBER FROM 2006 TO 2010



16-17
140 Bikes:

18-19
70 Bikes

THE WEB SURVEY

The web survey analysis is divided in four sections. Firstly, main findings are presented. The second section describes the spatial distribution of the residential location of the respondents. Thirdly, it is presented a descriptive statistic to analyze all the answers. In search of finding relationships between socio-demographic variables and the web survey answers, the last section presents a statistical analysis using the Chi2 test.

A total of 163 individuals that were riding a bike at Hans Broges Gade on September 2 answered the questionnaire in the period between September 2 and October 1.

Based on the Aarhus municipality count done in September 2009, on average there are 15 out of 1251 bicycle trips at Hans Broges Gade from 7am until 7pm – including both directions – on weekdays. Estimating that 35% of these cyclists ride their bikes at least once per day in the infrastructure, it was stipulated a total of 813 individuals ride a bike at Hans Broges Gade per day.

A total of 605 flyers were distributed to individuals riding their bikes in the infrastructure from 7am until 7pm and from these total 163 answered the questionnaire.

Based on these figures, the respondents represent 20,04% of the total of individuals riding a bike per day in the infrastructure and 26,94% of individuals that collected the flyer while riding a bike in the infrastructure on the 2nd of September 2010.

MAIN FINDINGS

The data from the survey reveals a picture of Hans Broges Gade as a piece of infrastructure used by the majority of the cyclists for commuting (45%). However, the main purpose of the trips from the other 55% of cyclists is very diverse (19% shopping, 13% educational institutions 6% recreational, 4% visiting family and friends and 13% others). The figures are directly connected to the built environment were the infrastructure is located – and main streets in a residential based neighborhood next to the city core.

After the Chi2 test was applied, the results highlight that most of the answers do not have a relationship with socio-demographic conditions. However, some representative relations between the independent variables – gender, age and educational level – and the questionnaire answers were identified.

There is a relationship between the main trip purpose when riding a bike at Hans Broges Gade including both age and educational level. Moreover, the opinion about how the design solution of the infrastructure impacted fast connectivity also has a relationship with both age and educational level.

Regarding the satisfaction with the design solution for Hans Broges Gade, it seems to have a relationship between the answers and educational level.

Finally, gender has a relationship with both the opinion about the awareness of pedestrians for cyclists and their opinion about the scenic and greenery quality of Hans Broges Gade.

The following section provides the actual data for each of the questions asked.

RESIDENTIAL LOCATION OF USERS

The residential addresses of the respondents – individuals riding a bike at Hans Broges Gade on September 2 – were registered and geo-referenced in order to produce a map (see Figure 3.2.46 and 3.2.47). According to the Table 3.1.1, the majority of the respondents (68,1%) live within a radius of 1 kilometer and 91,9% of them living within 5 kilometers distance from the infrastructure.

Respondents living more than 5 kilometers from the infrastructure correspond to 8,1% of the total and from this amount only 15% are living more than 10 kilometers away of the infrastructure.

	0-1 KM	1-2 KM	2-3 KM	3-4 KM	4-5 KM	5-10 KM	10-15 KM	15-20 KM	20 KI
NO. DWELLINGS	111	11	7	16	4	10	2	0	2
% DWELLINGS	68,1%	6,7%	4,3%	9,8%	2,5%	6,1%	1,2%	0,0%	1,2

Table 3.1.1: Absolute and percentage distribution of respondents according to the distance of their residential location from Hans Broges Gade.

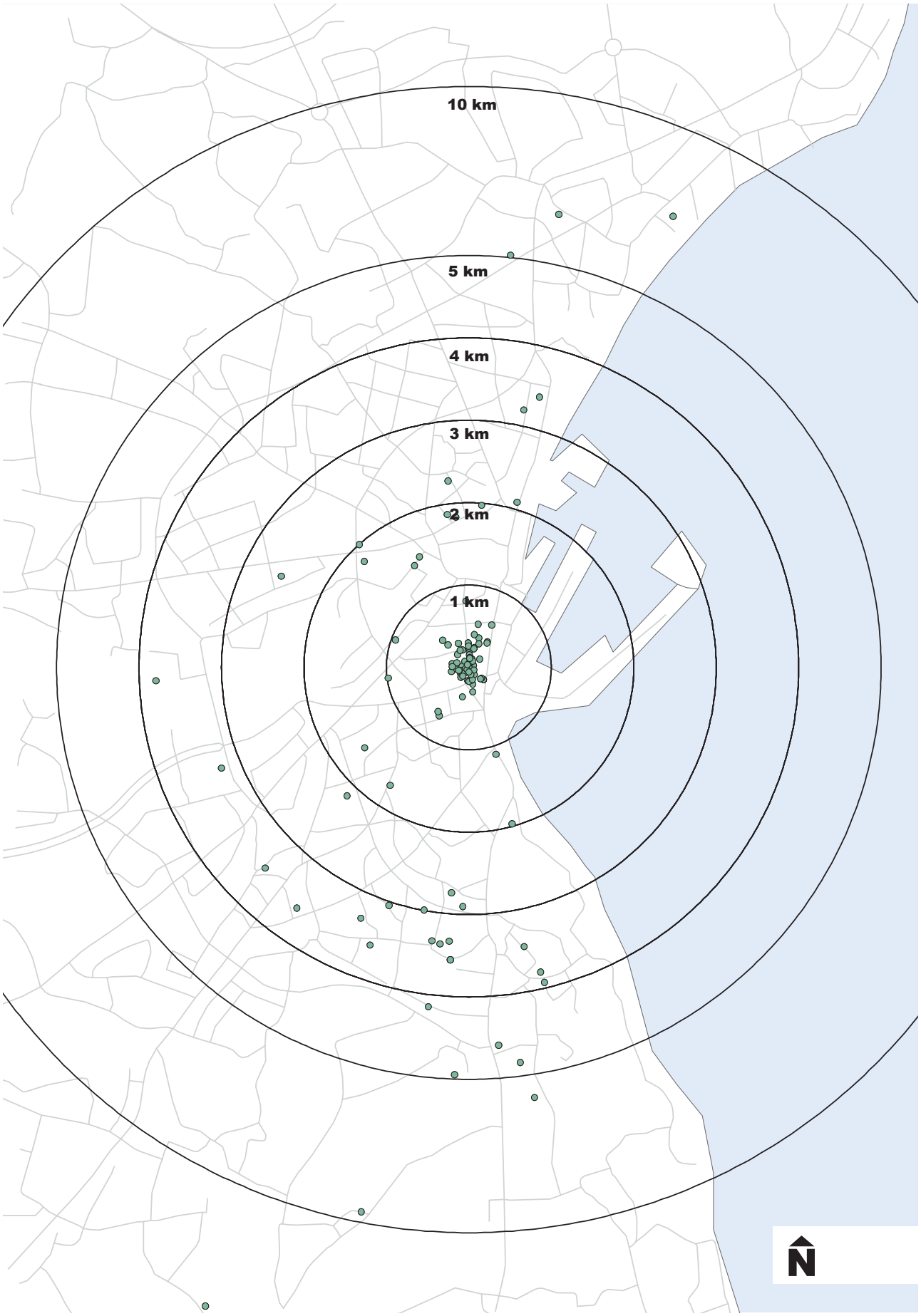


Figure 3.2.46: Spatial distribution of the respondents according to their residential location – 5km

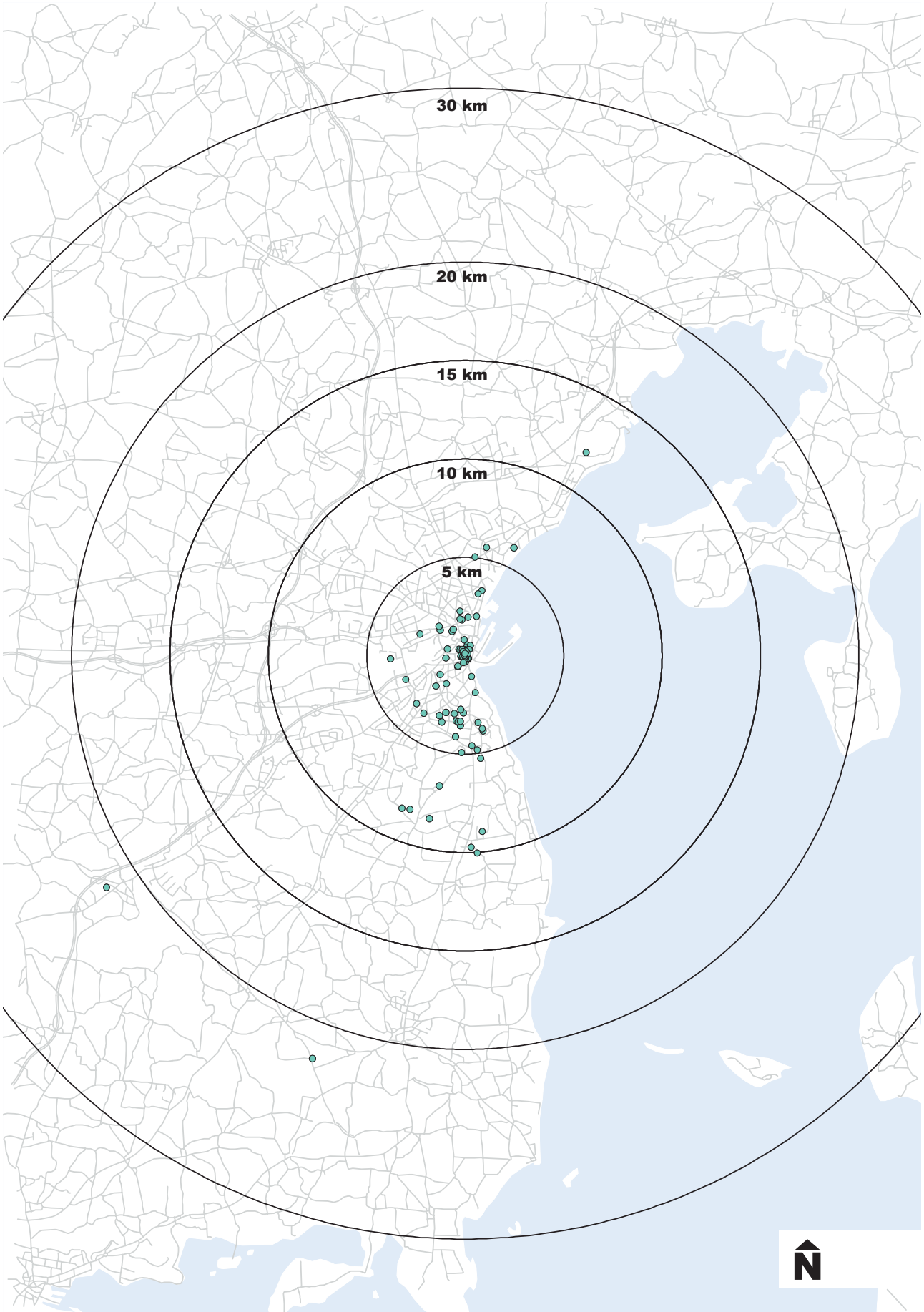


Figure 3.2.47: Spatial distribution of the respondents according to their residential location - 20km

DESCRIPTIVE STATISTICS

SOCIO-DEMOGRAPHICS

AGE

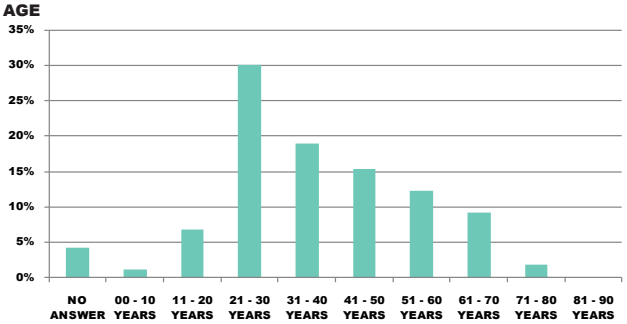


Figure 3.2.48: Distribution of the respondents by age groups.

The majority of the respondents at Hans Broges Gade are between 21-30 years (30%), followed by respondents aged 31-40 (19%) and aged 41-50 (15%). Older respondents range from aged from 51-60 (12%), age 61-70 (9%) and age 71-80 (2%). Younger respondents were in the aged 11-20 (6%) and age 0-10 (1%). No answer 3%. This shows that Hans Broges Gade is used mostly by younger people but also that the site is use by a wide ranges of ages.

GENDER

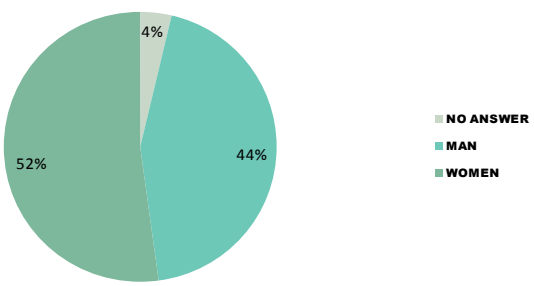


Figure 3.2.49: Distribution of the respondents by gender.

When asked about their gender, 52% of the respondents were women and 44% were men, with 4% giving no answer.

EDUCATION LEVEL

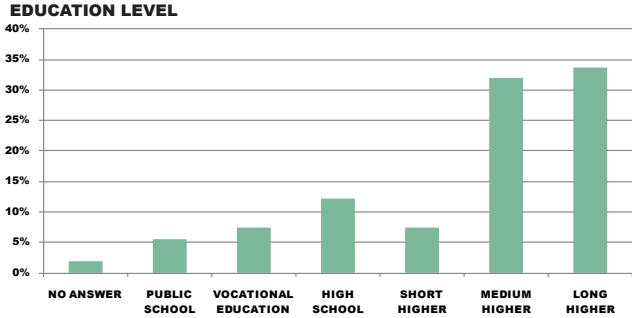


Figure 3.2.50: Distribution of the respondents by educational level.

The large majority of respondents answered that they have a long higher education (34%), or a medium long, higher education (32%). 7% respondents answered that they had attended higher education for a short amount of time, and another 7% respondents answered a vocational education. 12% of the respondents had a gymnasium education, 6% had receiving a public school education, and 2% giving no answer. It can thereby be concluded that the users of Hans Broges Gade overall have a high education level.

RIDING A BIKE AT HANS BROGES GADE

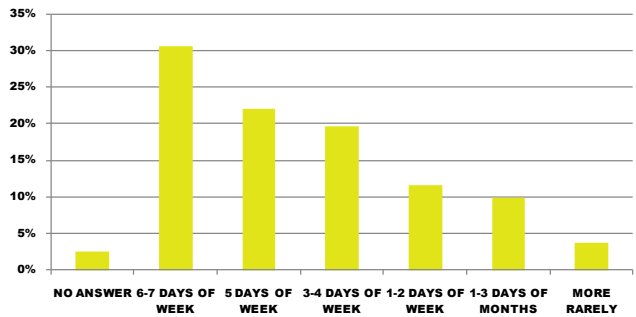


Figure 3.2.51: Distribution of the respondents by the frequency they ride a bicycle at Hans Broges Gade.

When asked how often they bike at the site, the majority 50% of the respondents said that they use the bridge 5 days per week (22%) or 6-7 days per week (31%). 20% of the respondents used the site 3-4 days per week, 12% said 1-2 days per week, 10% said 1-3 days per month and only 4% said that they rarely ride a bike that. The figures highlight that the site is a place where young people bike many days of the week.

WALKING AT HANS BROGES GADE

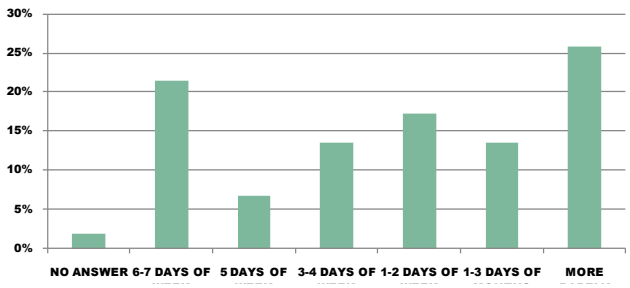


Figure 3.2.52: Distribution of the respondents by the frequency they walk at Hans Broges Gade.

Respondents were asked if they walk at Hans Broges Gade without bike. A majority responded traveled rarely without bike (26%). However, 21% answered to walk in the site 6-7 days a week (21%). 13% said 1-3 days a month, 17% said 1-2 days a week, 13% said 3-4 days a week, 7% stated 5 days a week and 2% gave no answer. This data shows that individuals that ride their bikes at Hans Broes Gade also walk in the site without their bikes.

MAIN TRIP PURPOSE

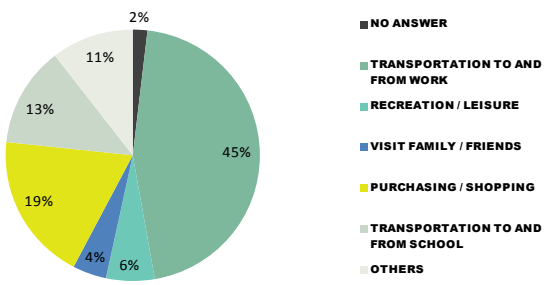


Figure 3.2.53: Distribution of the respondents by main trip purpose when riding a bike in Hans Broges Gade.

When asked for what purpose the respondents use Hans Broges Gade, 45% answered that they use the infrastructure for commuting to and from work. A great percentage 19% also used Hans Broges Gade for shopping, 13% used it to commute to school, 4% answered to see friends or family, 6% for recreation, 11% said other purpose and 2% gave no answer. This figure shows that Hans Broges Gade is as infrastructural element used for commuting but the street also has other infrastructural purposes.

FREQUENCY OF TRIPS TO THE MAIN PURPOSE

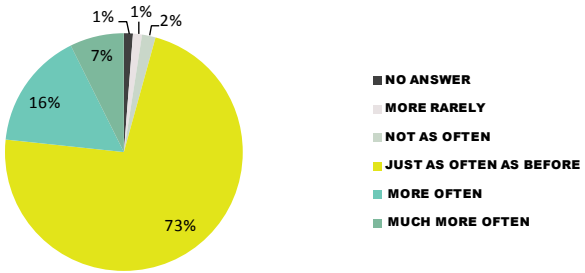


Figure 3.2.54: Distribution of the respondents by the frequency they ride a bike in Hans Broges Gade for the main purpose mentioned in the Figure 3.2.53 after the intervention in the site.

Respondents were asked, how often they use the bike for their main purposed as answered in previous question after the opening of Hans Broges Gade. 73% of respondents answered that they travel for that purpose just as often as before. 16% of respondents stated that they bike for that purpose more often and 7% said much more often. Only 2 % in total answered that they traveled less often and 1 % much less often. 1 % gave no answer. This data indicates that the opening of Hans Broges Gade have had an small impact on the amount of travelers, The opening have therefore had a impact on the bikeability of the city.

SATISFACTION WITH HANS BROGES GADE

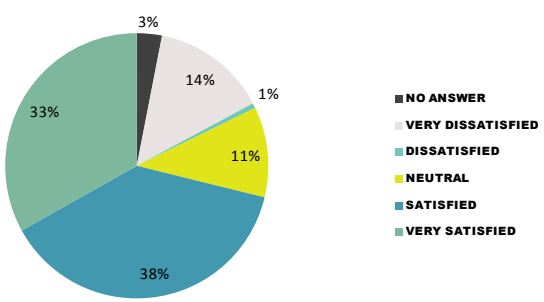


Figure 3.2.55: Distribution of the respondents by the level of satisfaction with the design of Hans Broges Gade

When asked how satisfied the respondent were with Hans Broges Gade 71% in total of them where satisfied (38%) or very satisfied (33%) with the new infrastructure. 11% were neutral, 1% were dissatisfied and 15% were very dissatisfied. 3% gave no answer. This figure shows that the majority likes the urban space wail a small majority of 15% that have issues with Hans Broges Gade.

HANS BROGES GADE'S DESIGN AND SAFETY

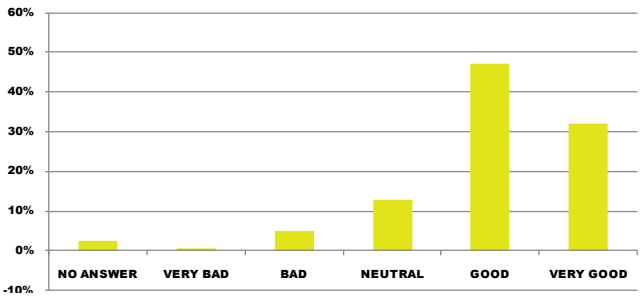


Figure 3.2.56: Distribution of the respondents according to their opinion about how the Hans Broges Gade`s design fulfilled the cyclist safety aspect.

Users were asked about the quality of the safety needs of the infrastructure. The largest portion of respondents thought the design did a good job. 32% answered it did a very good job and 47% that it did a good job. 13% were neutral on the issue, only 5% said that they thought it did a bad job and 1% a very bad job. 2% gave no answer. These responses are therefore very satisfied with the safety issues at Hans Broges Gade.

HANS BROGES GADE`S DESIGN AND AESTHETICS

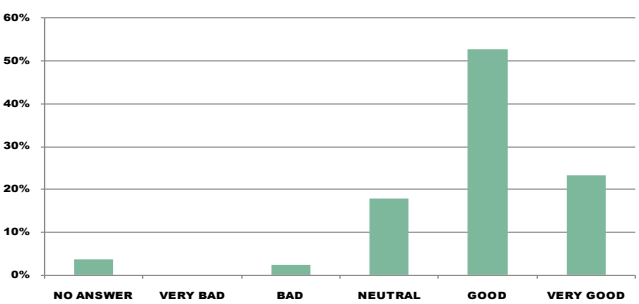


Figure 3.2.58: Distribution of the respondents according to their opinion about how the Hans Broges Gade`s design fulfilled the aesthetics aspect.

The respondents where asked about the aesthetics of the design of Hans Broges Gade, the majority of respondents stated that it either did a good (53%) or a very good (23%) job. A smaller part of the respondents were neutral (18%) in regards to beauty and aesthetics. A few said it did poorly (2%), or gave no answer (4%). This figure shows that people are satisfied with the aesthetics of the site.

HANS BROGES GADE'S DESIGN AND FAST CONNECTIVITY

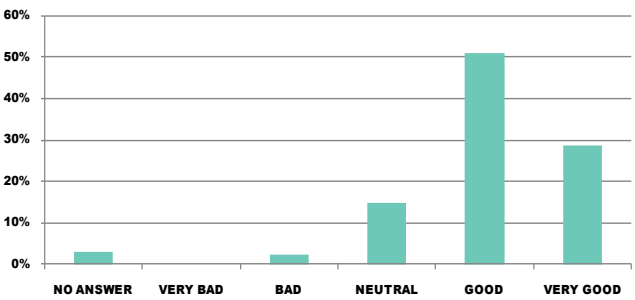


Figure 3.2.57: Distribution of the respondents according to their opinion about how the Hans Broges Gade`s design fulfilled the fast connectivity.

Respondents were asked if they thought the design of Hans Broges Gade was facilitating as a fast connections, and the majority responded that it did a good job (51%) or a very good job (29%). 15% respondents were neutral on the issue and very few stated that it did poorly (2%). 3% respondents gave no answer. From this figure, it is clear that Hans Broges Gade does a very good job of facilitating fast connections.

ILLEGALLY PARKED BICYCLES

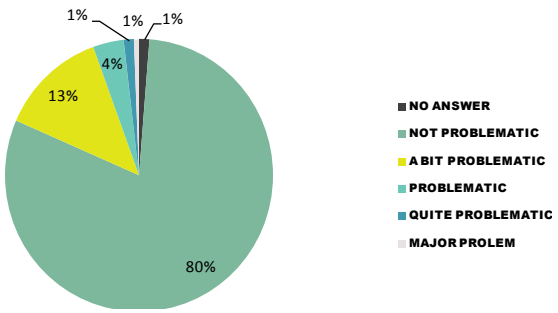


Figure 3.2.59: Distribution of the respondents according to their opinion about how problematic illegal parking of bicycles is at Hans Broges Gade.

Users were asked if they thought that illegally parked bicycles were a problem on the Hans Broges Gade. 80% of the responses said that they were not a problem, 13% said it was a small problem, 4% said it was problematic, 1% said it was quite problematic, and 1% said it was very problematic. 1% gave no answer. This figure shows that illegally parked bicycles are not a big problem at the site.

CONFLICT BETWEEN DIFFERENT TRANSPORT MODES

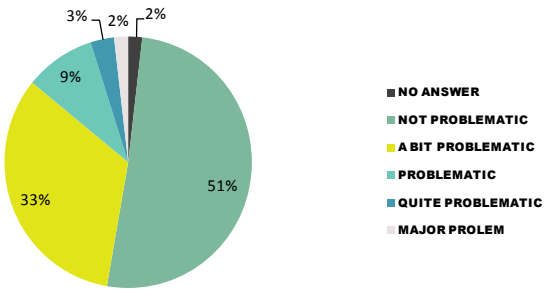


Figure 3.2.60: Distribution of the respondents according to their opinion about how problematic is the conflict between different transport modes at Hans Broges Gade.

Respondents were if there were issues with boundaries of bicycle paths, sidewalks and lanes. A little over half of the respondents 51% said it was not a problem. 33% stated that is was a bit of the problem, 9% claimed it was problematic, 3% said it was quite a problem, and 2% responded that it was a major problem. 2% gave no answer on whether passing space was an issue. This range shows that sidewalks can be a confusing space, and that almost half of the respondent saw it as problematic.

OBSTACLES

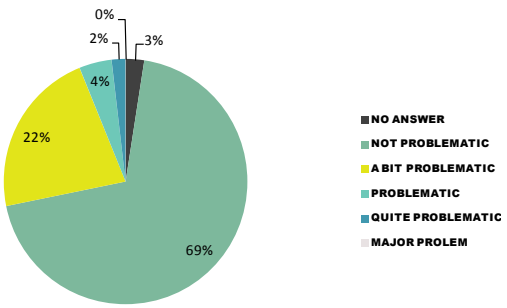


Figure 3.2.61: Distribution of the respondents according to their opinion about how problematic is the existence of obstacles against the cyclists at Hans Broges Gade.

Respondents were asked whether they thought obstacles at Hans Broges Gade were an issue. The majority of the respondent stated that obstacles were not a problem 69%. 22% stated that is was a small problem, 4% claimed it was problematic, 2% quite problematic, 3% gave no answer. This figure shows that only a small majority of users see obstacles as being an issue in using the Hans Broges Gade.

PAVEMENT PROBLEMS

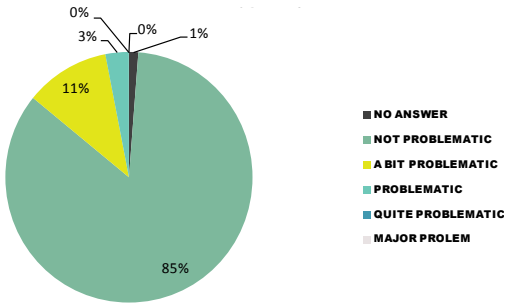


Figure 3.2.62: Distribution of the respondents according to their opinion about how problematic is the pavement at Hans Broges Gade.

When asked whether they thought surface issues like potholes were a problem on Hans Broges Gade, 85% of the responses said it was not a problem. 11% stated that it was a small problem, 3% claimed it was problematic. 1% gave no answer. This figure shows Hans Broges Gade has been well maintained, and therefore has a great percentage of satisfaction.

CRACKS IN RAMPS AND INTERSECTIONS

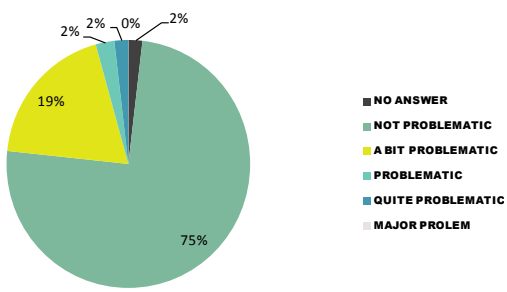


Figure 3.2.63: Distribution of the respondents according to their opinion about how problematic is the existence of cracks and ramps at Hans Broges Gade.

Users were asked whether they thought cracks were a problem in ramps and intersections. 75% of the responses said it was not a problem. 19% thought that it was a small problem, 2% claimed it was problematic, 2% said it was quite a problem. 2% gave no answer. These results show that cracks in ramps and intersections can be a small problem, one that could be fixed with maintenance.

AWARENESS OF PEDESTRIANS AND MOTORIZED VEHICLE DRIVERS FOR CYCLISTS

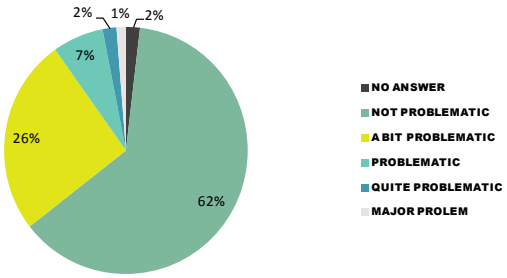


Figure 3.2.64: Distribution of the respondents according to their opinion about how problematic is the lack of awareness of pedestrians and motorized vehicle drivers for people riding a bike at Hans Broges Gade.

Respondents were asked whether they thought lack of awareness of pedestrians for cyclists was an issue. Most users 62% thought it was not a problem or a small problem 26%. 7% stated it was problematic, 2% said it was quite a problem, and 1% responded that this was a major problem. 2% gave no answer. This figure shows that cyclists perceive a problem in regards the awareness of pedestrians and motorized vehicle drivers for cyclists.

SCENIC

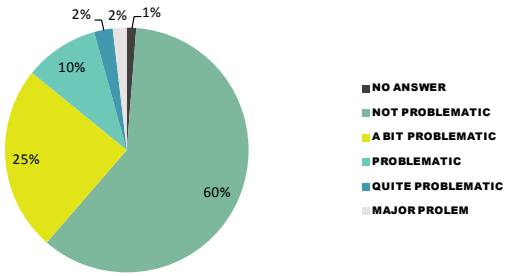


Figure 3.2.66: Distribution of the respondents according to their opinion about how problematic is scenic and greenery at Hans Broges Gade.

When asked whether they thought poor greenery and scenic landscaping was an issue at Hans Broges Gade, 60% of the responses said it was not a problem, 25% said it was a small problem, 10% stated it was problematic, 2% said it was quite a problem, and 2% responded that this was a major problem. 1% gave no answer. This figure shows that greenery can be a problem and that the lack of it is noticed by some users.

SIGNPOSTING AND ITS INTERPRETATION

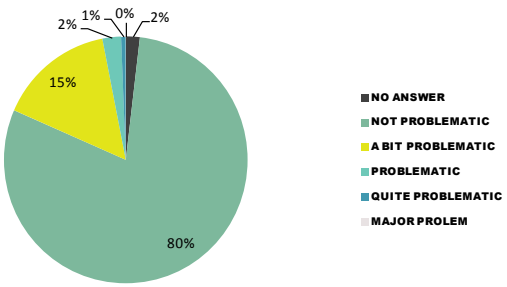


Figure 3.2.65: Distribution of the respondents according to their opinion about how problematic is signposting and its interpretation at Hans Broges Gade.

When asked whether poor signage was an issue, 80% of the responses said it was not a problem, 15% said it was a small problem, 2% stated it was problematic, 1% said it was quite a problem. 2% gave no answer. This figure shows that signage is not a major issue and that the design conveys how it should be used clearly to the user.

BIKING MORE OFTEN AFTER HANS BROGES GADE INTERVENTION

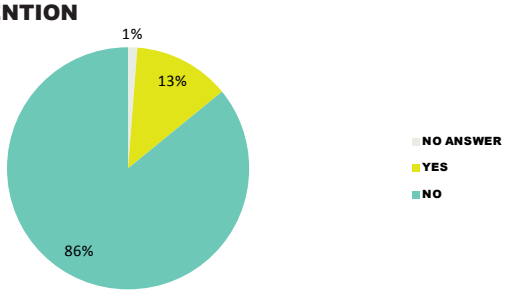


Figure 3.2.67: Distribution of the respondents based on starting to ride a bike more often, or not, after the intervention at Hans Broges Gade.

When asked whether they bike more often after the opening of Hans Broges Gade, 86% said they have not biked more while 13% said yes. 1% gave no answer. A small amount of the respondents are biking more often after the opening of Hans Broges Gade, which thereby states that the new design have improved that bikeability of the site and the amount of bikers.

QUALITIES INFLUENCING TO RIDE A BIKE

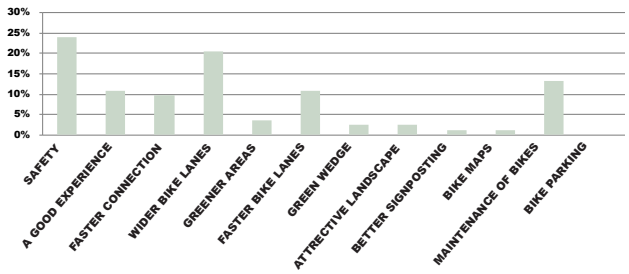


Figure 3.2.68: Among the respondents that said yes in the previous question (Figure 3.2.67), what qualities has influenced their choice to ride a bike more often after the intervention in Hans Broges Gade. The respondents could choose more than one option.

Respondents were asked what aspect of the intervention make them ride their bike more often, the largest portion of users stated that safety (24%) was an important factor. 20% responded saying wide bicycle lanes made them ride more, and 13% stated that maintenance made an impact for them. 11% stated they rode more because Hans Broges Gade was a nice experience, and because faster bike lanes made the difference for them. The most important factors for the bikeability at Hans Broges Gade is therefore safety issues and the conditions of the bike lanes such as the proportions of the lane and the maintenance of it.

STREET DESIGN INFLUENCING TO RIDE A BIKE

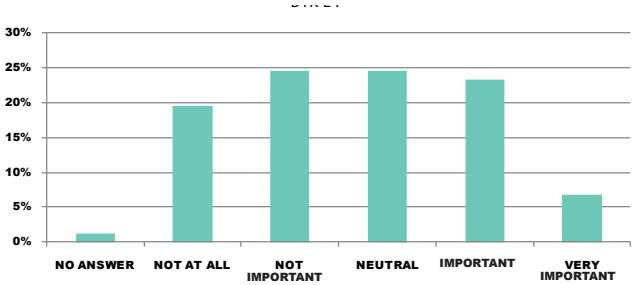


Figure 3.2.69: Distribution of respondents according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Users were asked, how important street design is in your decision to ride your bicycle. 25% of the respondents were neutral on the issue, 25% said it was not important, and 23% said it was important. 20% respondents stated that it was not important at all and 7% that is was very important factor for them. This figure shows that while streetscape is not a critical factor in bicycle use, they are still important and noticed by users.

STREET DESIGN SOLUTIONS AT HANS BROGES GADE

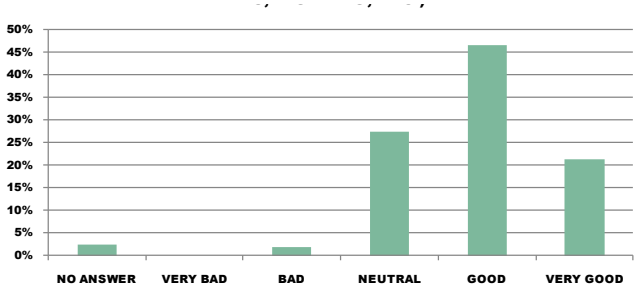


Figure 3.2.70: Distribution of respondents according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in the intervention at Hans Broges Gade.

When asked for their opinion on the design solution applied to Hans Broges Gade, most respondents replied that it was a good solution (47%) or that they were neutral on the issue (28%). 21% believed it was a very good design solution, only 2% thought it was bad, and 2% gave no answer. This figure shows that many believe that lighting and green scape at Hans Broges Gade is very well done.

RELATIONS BETWEEN SOCIO-DEMOGRAPHIC VARIABLES AND WEB-SURVEY ANSWERS

The Chi2 test was applied to identify possible relations between the socio-demographics (independent variables) of the sample and their answers from the web survey (dependable variables). Considering the nature of the studied variables – the majority of them are nominal – the Chi2 test was selected to this analysis.

The Chi2 test is about finding out if there is a connection between the variables. It is about testing the nul hypothesis. H0 says that the variables are statistic independent and HA says the variables are statistic dependent. To the test we set a α-level at 0,05. In the case of the p-value is under that, we can't reject the nul hypothesis.

SOCIO-DEMOGRAPHICS AND RIDING A BIKE AT HANS BROGES GADE

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
MALE	20	19	15	7	7	3	71
FEMALE	29	17	15	11	9	3	84
TOTAL	49	36	30	18	16	6	155

Table 3.2.2: Distribution of the respondents by gender according to the frequency they ride a bicycle at Hans Broges Gade.

Out of the Table 3.2.2, the SPSS calculated the Chi2 to be 1,826 with a degree of freedom (df) 5 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
PUBLIC SCHOOL	1	3	1	1	2	1	9
VOCATIONAL EDUC.	4	4	2	1	1	0	12
HIGH SCHOOL	5	5	5	4	0	1	20
SHORT HIGHER EDUC.	6	3	2	0	1	0	12
MEDIUM HIGHER EDUC.	14	10	10	6	9	2	51
LONG HIGHER EDUC.	20	11	12	6	3	2	54
TOTAL	50	36	32	18	16	6	158

Table 3.2.3: Distribution of the respondents by educational level according to the frequency they ride a bicycle at Hans Broges Gade.

Out of the table 3.2.3, the SPSS calculated the Chi2 to be 18,265 with a degree of freedom (df) 25 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
01-20 YEARS	4	2	2	4	1	0	13
21-30 YEARS	13	11	16	3	3	3	49
31-40 YEARS	7	7	8	2	5	1	30
41-50 YEARS	7	9	3	3	2	0	24
51-60 YEARS	11	3	1	3	2	0	20
61-90 YEARS	7	3	2	3	2	1	18
TOTAL	49	35	32	18	15	5	154

Table 3.2.4: Distribution of the respondents by age groups according to the frequency they ride a bicycle at Hans Broges Gade.

Out of the table 3.2.4, the SPSS calculated the Chi2 to be 28,519 with a degree of freedom (df) 25 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND WALKING AT HAND BROGES GADE

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
MALE	15	5	9	13	8	21	71
FEMALE	20	5	11	15	14	19	84
TOTAL	35	10	20	28	22	40	155

Table 3.2.5: Distribution of the respondents by gender according to the frequency they walk at Hans Broges Gade.

Out of the table 3.2.5, the SPSS calculated the Chi2 to be 1,715 with a degree of freedom (df) 5 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
PUBLIC SCHOOL	0	2	0	2	2	3	9
VOCATIONAL EDUC.	1	1	2	5	1	2	12
HIGH SCHOOL	3	0	4	6	4	3	20
SHORT HIGHER EDUC.	3	1	1	2	3	2	12
MEDIUM HIGHER EDUC.	12	2	10	4	6	17	51
LONG HIGHER EDUC.	166	5	5	9	6	13	54
TOTAL	35	11	22	28	22	40	158

Table 3.2.6: Distribution of the respondents by educational level according to the frequency they walk at Hans Broges Gade.

Out of the table 3.2.6, the SPSS calculated the Chi2 to be 29,062 with a degree of freedom (df) 25 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
01-20 YEARS	1	0	2	5	3	2	13
21-30 YEARS	13	5	12	6	4	8	48
31-40 YEARS	6	1	4	6	5	9	31
41-50 YEARS	6	2	2	5	3	6	24
51-60 YEARS	4	1	1	1	4	9	20
61-90 YEARS	4	1	1	3	3	6	18
TOTAL	34	10	22	26	22	40	154

Table 3.2.7: Distribution of the respondents by age groups according to the frequency they walk at Hans Broges Gade.

Out of the table 3.2.7, the SPSS calculated the Chi2 to be 25,515 with a degree of freedom (df) 25 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND MAIN TRIP PURPOSE

	TRANS. TO AND FROM WORK	RECREA-TION/ LEISURE	VISIT FAMILY/ FRIENDS	PURCHA-SING/ SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
MALE	31	6	4	11	9	9	70
FEMALE	41	4	3	18	11	8	85
TOTAL	72	10	7	29	20	17	155

Table 3.2.8: Distribution of the respondents by gender according to the main trip purpose when riding a bike in Hans Broges Gade.

Out of the table 3.2.8, the SPSS calculated the Chi2 to be 2,452 with a degree of freedom (df) 5 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	TRANS. TO AND FROM WORK	RECREA-TION/ LEISURE	VISIT FAMILY/ FRIENDS	PURCHA-SING/ SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
PUBLIC SCHOOL	1	1	1	2	2	2	9
VOCATIONAL EDUC.	7	0	0	1	1	2	11
HIGH SCHOOL	7	0	1	4	6	2	20
SHORT HIGHER EDUC.	7	0	0	3	1	1	21
MEDIUM HIGHER EDUC.	19	5	2	14	5	6	51
LONG HIGHER EDUC.	32	4	3	7	5	4	55
TOTAL	73	10	7	31	20	17	158

Table 3.2.9: Distribution of the respondents by educational level according to the main trip purpose when riding a bike in Hans Broges Gade.

Out of the table 3.2.9, the SPSS calculated the Chi2 to be 25,573 with a degree of freedom (df) 25 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	TRANS. TO AND FROM WORK	RECREA-TION/ LEISURE	VISIT FAMILY/ FRIENDS	PURCHA-SING /SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
01-20 YEARS	2	0	0	1	7	3	13
21-30 YEARS	16	6	2	11	12	2	49
31-40 YEARS	15	2	2	7	1	4	31
41-50 YEARS	18	0	1	1	0	4	24
51-60 YEARS	12	1	1	6	0	0	20
61-90 YEARS	6	1	1	5	0	4	17
TOTAL	69	10	7	31	20	17	154

Table 3.2.10: Distribution of the respondents by age groups according to the main trip purpose when riding a bike in Hans Broges Gade.

Out of the table 3.2.10, the SPSS calculated the Chi2 to be 63,503 with a degree of freedom (df) 25 and the missing values are 9. P is less than 0,001. Therefore, the variables are dependent.

SOCIO-DEMOGRAPHICS AND FREQUENCY OF TRIPS TO THE MAIN PURPOSE

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
MALE	0	2	52	10	7	71
FEMALE	2	1	62	15	5	85
TOTAL	2	3	114	25	12	156

Table 3.2.11: Distribution of the respondents by gender according to the frequency they ride a bike in Hans Broges Gade for the main purpose mentioned in the Figure 3.2.53, after the intervention in Hans Broges Gade.

Out of the table 3.2.11, the SPSS calculated the Chi2 to be 3,314 with a degree of freedom (df) 5 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
PUBLIC SCHOOL	0	2	5	0	2	9
VOCATIONAL EDUC.	0	0	8	2	2	12
HIGH SCHOOL	0	0	14	6	0	20
SHORT HIGHER EDUC.	0	0	8	3	1	12
MEDIUM HIGHER EDUC.	1	1	40	7	2	51
LONG HIGHER EDUC.	1	0	41	8	5	55
TOTAL	2	3	116	26	12	159

Table 3.2.12: Distribution of the respondents by educational level according to the frequency they ride a bike in Hans Broges Gade for the main purpose mentioned in the Figure 3.2.53, after the intervention in Hans Broges Gade.

Out of the table 3.2.12, the SPSS calculated the Chi2 to be 34,451 with a degree of freedom (df) 20 and the missing values are 4. P is between 0,025 and 0,010. Therefore, the variables are dependent.

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
01-20 YEARS	0	1	8	4	0	13
21-30 YEARS	0	2	33	12	2	49
31-40 YEARS	0	0	24	4	3	31
41-50 YEARS	1	0	20	2	1	24
51-60 YEARS	1	0	11	4	4	20
61-90 YEARS	0	0	16	0	2	18
TOTAL	2	3	112	26	12	155

Table 3.2.13: Distribution of the respondents by age groups according to the frequency they ride a bike in Hans Broges Gade for the main purpose mentioned in the Figure 3.2.53, after the intervention in Hans Broges Gade.

Out of the table 3.2.13, the SPSS calculated the Chi2 to be 26,945 with a degree of freedom (df) 20 and the missing values are 8. P is between 0,250 and 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND SATISFACTION WITH HANS BROGES GADE

	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	13	0	6	29	21	69
FEMALE	10	1	11	31	31	84
TOTAL	23	1	17	60	52	153

Table 3.2.14: Distribution of the respondents by gender according to the level of satisfaction with the design of Hans Broges Gade.

Out of the table 3.2.14, the SPSS calculated the Chi2 to be 3,414 with a degree of freedom (df) 4 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	4	0	3	1	1	9
VOCATIONAL EDUC.	3	0	0	3	5	11
HIGH SCHOOL	4	0	2	13	1	20
SHORT HIGHER EDUC.	1	0	1	5	5	12
MEDIUM HIGHER EDUC.	6	0	3	19	21	49
LONG HIGHER EDUC.	5	1	8	21	20	55
TOTAL	23	1	17	62	53	156

Table 3.2.15: Distribution of the respondents by educational level according to the level of satisfaction with the design of Hans Broges Gade.

Out of the table 3.2.15, the SPSS calculated the Chi2 to be 31,388 with a degree of freedom (df) 20 and the missing values are 7. P is between 0,050 and 0,025 but close to 0,050. Therefore, the variables are dependent.

	VERY DISSATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	2	4	6	1	13
21-30 YEARS	9	3	20	17	49
31-40 YEARS	3	4	16	8	31
41-50 YEARS	5	3	7	8	23
51-60 YEARS	2	2	5	11	20
61-90 YEARS	1	1	6	8	16
TOTAL	22	17	60	53	153

Table 3.2.16: Distribution of the respondents by age groups according to the level of satisfaction with the design of Hans Broges Gade.

Out of the table 3.2.16, the SPSS calculated the Chi2 to be 18,723 with a degree of freedom (df) 15 and the missing values are 11. P is between 0,250 and 0,100, but close to 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE IMPACT OF HANS BROGES GADE`S DESIGN ON SAFETY

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	0	4	8	39	19	70
FEMALE	1	4	11	37	31	84
TOTAL	1	8	19	76	50	154

Table 3.2.17: Distribution of the respondents by gender according to their opinion about how the Hans Broges Gade`s design fulfilled the cyclists safety aspect.

Out of the table 3.2.17, the SPSS calculated the Chi2 to be 3,160 with a degree of freedom (df) 4 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	1	2	2	4	9
VOCATIONAL EDUC.	0	0	0	4	8	12
HIGH SCHOOL	1	3	2	11	2	19
SHORT HIGHER EDUC.	0	0	3	5	4	12
MEDIUM HIGHER EDUC.	0	1	6	24	19	50
LONG HIGHER EDUC.	0	3	7	31	14	55
TOTAL	1	8	20	77	51	157

Table 3.2.18: Distribution of the respondents by educational level according to their opinion about how the Hans Broges Gade`s design fulfilled the cyclists safety aspect.

Out of the table 3.2.18, the SPSS calculated the Chi2 to be 29,831 with a degree of freedom (df) 20 and the missing values are 6. P is between 0,100 and 0,050. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	1	4	6	2	13
21-30 YEARS	0	0	7	26	15	48
31-40 YEARS	1	1	3	20	6	31
41-50 YEARS	0	3	2	9	10	24
51-60 YEARS	0	1	2	5	11	19
61-90 YEARS	0	1	1	9	7	18
TOTAL	1	7	19	75	51	153

Table 3.2.19: Distribution of the respondents by age group according to their opinion about how the Hans Broges Gade`s design fulfilled the cyclists safety aspect.

Out of the table 3.2.19, the SPSS calculated the Chi2 to be 26,529 with a degree of freedom (df) 20 and the missing values are 10. P is between 0,250 and 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE IMPACT OF HANS BROGES GADE`S DESIGN ON FAST CONNECTIVITY

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	2	9	37	21	69
FEMALE	1	14	45	24	84
TOTAL	3	23	82	45	153

Table 3.2.20: Distribution of the respondents by gender according to their opinion about how the Hans Broges Gade`s design fulfilled the fast connectivity.

Out of the table 3.2.20, the SPSS calculated the Chi2 to be 0,939 with a degree of freedom (df) 3 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	2	0	5	1	8
VOCATIONAL EDUC.	0	1	3	8	12
HIGH SCHOOL	0	3	11	5	19
SHORT HIGHER EDUC.	1	1	6	4	12
MEDIUM HIGHER EDUC.	0	6	31	13	50
LONG HIGHER EDUC.	1	12	27	15	55
TOTAL	4	23	83	46	156

Table 3.2.21: Distribution of the respondents by educational level according to their opinion about how the Hans Broges Gade`s design fulfilled the fast connectivity.

Out of the table 3.2.21, the SPSS calculated the Chi2 to be 33,203 with a degree of freedom (df) 25 and the missing values are 7. P is between 0,005 and 0,001. Therefore, the variables are dependent.

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	1	1	9	2	13
21-30 YEARS	1	4	30	12	47
31-40 YEARS	0	7	18	6	31
41-50 YEARS	0	5	13	6	24
51-60 YEARS	0	2	5	12	19
61-90 YEARS	1	4	6	7	18
TOTAL	3	23	81	45	152

Table 3.2.22: Distribution of the respondents by age groups according to their opinion about how the Hans Broges Gade`s design fulfilled the fast connectivity.

Out of the table 3.2.22, the SPSS calculated the Chi2 to be 24,992 with a degree of freedom (df) 15 and the missing values are 11. P is between 0,100 and 0,050, but very close to 0,050. The variables are independent, but are very close to be dependent. If there is a bit of uncertainty the variables could be dependent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT HANS BROGES GADE`S AESTHETICS

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	2	15	37	14	68
FEMALE	2	13	47	22	84
TOTAL	4	28	84	36	152

Table 3.2.23: Distribution of the respondents by gender according to their opinion about how the Hans Broges Gade`s design fulfilled the aesthetics aspect.

Out of the table 3.2.23, the SPSS calculated the Chi2 to be 1,443 with a degree of freedom (df) 3 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	2	3	3	8
VOCATIONAL EDUC.	0	1	5	6	12
HIGH SCHOOL	2	5	9	3	19
SHORT HIGHER EDUC.	0	0	7	5	12
MEDIUM HIGHER EDUC.	1	8	29	11	49
LONG HIGHER EDUC.	1	13	32	9	55
TOTAL	4	29	85	37	155

Table 3.2.24: Distribution of the respondents by educational level according to their opinion about how the Hans Broges Gade`s design fulfilled the aesthetics aspect.

Out of the Table 3.2.24, the SPSS calculated the Chi2 to be 19,034 with a degree of freedom (df) 15 and the missing values are 8. P is between 0,250 and 0,100. Therefore, the variables are independent.

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	1	3	7	2	13
21-30 YEARS	1	11	29	6	47
31-40 YEARS	2	5	18	6	31
41-50 YEARS	0	1	14	9	24
51-60 YEARS	0	3	7	9	19
61-90 YEARS	0	5	9	3	17
TOTAL	4	28	84	35	151

Table 2.3.25: Distribution of the respondents by age groups according to their opinion about how the Hans Broges Gade`s design fulfilled the aesthetics aspect.

Out of the Table 2.3.25, the SPSS calculated the Chi2 to be 20,745 with a degree of freedom (df) 15 and the missing values are 12. P is between 0,250 and 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT ILLEGALLY PARKED BICYCLES

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	56	10	4	1	0	71
FEMALE	71	11	1	1	1	85
TOTAL	127	21	5	2	1	156

Table 2.3.26: Distribution of the respondents by gender according to their opinion about how problematic illegal parking of bicycles is at Hans Broges Gade.

Out of the Table 2.3.26, the SPSS calculated the Chi2 to be 3,390 with a degree of freedom (df) 4 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	8	1	0	0	0	9
VOCATIONAL EDUC.	7	4	0	0	1	12
HIGH SCHOOL	18	2	0	0	0	20
SHORT HIGHER EDUC.	9	2	1	0	0	12
MEDIUM HIGHER EDUC.	39	8	3	1	0	51
LONG HIGHER EDUC.	49	4	1	1	0	55
TOTAL	130	21	5	2	1	159

Table 2.3.27: Distribution of the respondents by educational level according to their opinion about how problematic illegal parking of bicycles is at Hans Broges Gade.

Out of the Table 2.3.27, the SPSS calculated the Chi2 to be 24,403 with a degree of freedom (df) 20 and the missing values are 4. P is between 0,250 and 0,100. Therefore, the variables are independent

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	12	1	0	0	0	13
21-30 YEARS	37	8	3	1	0	49
31-40 YEARS	26	5	0	0	0	31
41-50 YEARS	22	2	0	0	0	24
51-60 YEARS	17	1	0	1	1	20
61-90 YEARS	12	4	2	0	0	18
TOTAL	126	21	5	2	1	155

Table 2.3.28: Distribution of the respondents by age groups according to their opinion about how problematic illegal parking of bicycles is at Hans Broges Gade.

Out of the Table 2.3.28, the SPSS calculated the Chi2 to be 22,356 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT CONFLICT BETWEEN DIFFERENT TRANSPORT MODES

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	32	28	5	4	1	70
FEMALE	48	25	9	1	2	85
TOTAL	80	53	14	5	3	155

Table 3.2.29: Distribution of the respondents by gender according to their opinion about how problematic is the conflict between different transport modes at Hans Broges Gade.

Out of the Table 3.2.29, the SPSS calculated the Chi2 to be 5,243 with a degree of freedom (df) 4 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	5	3	1	0	0	9
VOCATIONAL EDUC.	7	2	2	1	0	12
HIGH SCHOOL	5	11	1	2	1	20
SHORT HIGHER EDUC.	5	5	2	0	0	12
MEDIUM HIGHER EDUC.	33	14	3	0	1	51
LONG HIGHER EDUC.	27	19	5	2	1	54
TOTAL	82	54	14	5	3	158

Table 3.2.30: Distribution of the respondents by educational level according to their opinion about how problematic is the conflict between different transport modes at Hans Broges Gade.

Out of the Table 3.2.30, the SPSS calculated the Chi2 to be 19,796 with a degree of freedom (df) 20 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	5	5	2	1	0	13
21-30 YEARS	28	14	5	1	1	49
31-40 YEARS	10	16	2	1	2	31
41-50 YEARS	15	7	2	0	0	24
51-60 YEARS	12	4	2	2	0	20
61-90 YEARS	11	5	1	0	0	17
TOTAL	81	51	14	5	3	154

Table 3.2.31: Distribution of the respondents by age groups according to their opinion about how problematic is the conflict between different transport modes at Hans Broges Gade.

Out of the Table 3.2.31, the SPSS calculated the Chi2 to be 20,016 with a degree of freedom (df) 20 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT OBSTACLES AGAINST CYCLISTS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	TOTAL
MALE	49	16	3	1	69
FEMALE	60	19	4	2	85
TOTAL	109	35	7	3	154

Table 3.2.32: Distribution of the respondents by gender according to their opinion about how problematic is the existence of obstacles against the cyclists at Hans Broges Gade.

Out of the Table 3.2.32, the SPSS calculated the Chi2 to be 0,183 with a degree of freedom (df) 3 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	TOTAL
PUBLIC SCHOOL	6	2	0	0	8
VOCATIONAL EDUC.	7	5	0	0	12
HIGH SCHOOL	15	2	1	2	20
SHORT HIGHER EDUC.	7	4	1	0	12
MEDIUM HIGHER EDUC.	38	9	4	0	51
LONG HIGHER EDUC.	39	13	1	1	54
TOTAL	112	35	7	3	157

Table 3.2.33: Distribution of the respondents by educational level according to their opinion about how problematic is the existence of obstacles against the cyclists at Hans Broges Gade.

Out of the Table 3.2.33, the SPSS calculated the Chi2 to be 17,207 with a degree of freedom (df) 15 and the missing values are 6. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	TOTAL
01-20 YEARS	9	3	0	1	13
21-30 YEARS	30	12	5	1	48
31-40 YEARS	24	5	1	1	31
41-50 YEARS	20	3	1	0	24
51-60 YEARS	15	5	0	0	20
61-90 YEARS	10	7	0	0	17
TOTAL	108	35	7	3	153

Table 3.2.34: Distribution of the respondents by age groups according to their opinion about how problematic is the existence of obstacles against the cyclists at Hans Broges Gade.

Out of the Table 3.2.34, the SPSS calculated the Chi2 to be 15,594 with a degree of freedom (df) 15 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE PAVEMENT

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	Total
MALE	63	6	2	71
FEMALE	71	11	3	85
TOTAL	134	17	5	156

Table 3.2.35: Distribution of the respondents by gender according to their opinion about how problematic is the pavement at Hans Broges Gade.

Out of the Table 3.2.35, the SPSS calculated the Chi2 to be 0,899 with a degree of freedom (df) 2 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	TOTAL
PUBLIC SCHOOL	7	2	0	9
VOCATIONAL EDUC.	9	3	0	12
HIGH SCHOOL	16	4	0	20
SHORT HIGHER EDUC.	11	0	1	12
MEDIUM HIGHER EDUC.	41	8	2	51
LONG HIGHER EDUC.	53	0	2	55
TOTAL	167	17	5	159

Table 3.2.36: Distribution of the respondents by educational level according to their opinion about how problematic is the pavement at Hans Broges Gade.

Out of the Table 3.2.36, the SPSS calculated the Chi2 to be 17,086 with a degree of freedom (df) 10 and the missing values are 4. P is between 0,250 and 0,100. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	TOTAL
01-20 YEARS	10	2	1	13
21-30 YEARS	41	5	8	49
31-40 YEARS	26	5	0	31
41-50 YEARS	23	1	0	24
51-60 YEARS	18	2	0	20
61-90 YEARS	15	2	1	18
TOTAL	133	17	5	155

Table 3.2.37: Distribution of the respondents by age groups according to their opinion about how problematic is the pavement at Hans Broges Gade.

Out of the Table 3.2.37, the SPSS calculated the Chi2 to be 7,335 with a degree of freedom (df) 10 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT CRACKS IN RAMPS AND INTERSECTIONS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	TOTAL
MALE	57	9	3	2	71
FEMALE	61	21	1	1	84
TOTAL	118	30	4	3	155

Table 3.2.38: Distribution of the respondents by gender according to their opinion about how problematic is the existence of cracks in ramps at Hans Broges Gade.

Out of the Table 3.2.38, the SPSS calculated the Chi2 to be 5,215 with a degree of freedom (df) 3 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	TOTAL
PUBLIC SCHOOL	7	2	0	0	9
VOCATIONAL EDUC.	9	2	0	0	11
HIGH SCHOOL	16	2	1	1	20
SHORT HIGHER EDUC.	10	2	0	0	12
MEDIUM HIGHER EDUC.	36	13	1	1	51
LONG HIGHER EDUC.	43	9	2	1	55
TOTAL	121	30	4	3	158

Table 3.2.39: Distribution of the respondents by educational level according to their opinion about how problematic is the existence of cracks in ramps at Hans Broges Gade.

Out of the Table 3.2.39, the SPSS calculated the Chi2 to be 5,920 with a degree of freedom (df) 15 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	TOTAL
01-20 YEARS	12	1	0	0	13
21-30 YEARS	31	13	4	1	49
31-40 YEARS	25	5	0	1	31
41-50 YEARS	22	2	0	0	24
51-60 YEARS	15	4	0	0	19
61-90 YEARS	13	4	0	1	18
TOTAL	118	29	4	3	154

Table 3.2.40: Distribution of the respondents by age groups according to their opinion about how problematic is the existence of cracks in ramps at Hans Broges Gade.

Out of the Table 3.2.40, the SPSS calculated the Chi2 to be 17,602 with a degree of freedom (df) 15 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT AWARENESS OF PEDESTRIANS AND MOTORIZED VEHICLE DRIVERS FOR CYCLISTS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	43	15	8	3	2	71
FEMALE	54	27	3	0	0	84
TOTAL	97	42	11	3	2	155

Table 3.2.41: Distribution of the respondents by gender according to their opinion about how problematic is the lack of awareness of pedestrians and motorized vehicle drivers for people riding a bike at Hans Broges Gade.

Out of the Table 3.2.41, the SPSS calculated the Chi2 to be 10,935 with a degree of freedom (df) 4 and the missing values are 8. P is between 0,050 and 0,025. Therefore, the variables are dependent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	6	1	2	0	0	9
VOCATIONAL EDUC.	7	4	1	0	0	12
HIGH SCHOOL	12	5	2	1	0	20
SHORT HIGHER EDUC.	5	7	0	0	0	12
MEDIUM HIGHER EDUC.	35	11	4	0	1	51
LONG HIGHER EDUC.	35	14	2	2	1	54
TOTAL	100	42	11	3	2	158

Table 3.2.42: Distribution of the respondents by educational level according to their opinion about how problematic is the lack of awareness of pedestrians and motorized vehicle drivers for people riding a bike at Hans Broges Gade.

Out of the Table 3.2.42, the SPSS calculated the Chi2 to be 16,880 with a degree of freedom (df) 20 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	8	4	1	0	0	13
21-30 YEARS	33	9	5	1	0	48
31-40 YEARS	19	7	2	1	2	31
41-50 YEARS	13	11	0	0	0	24
51-60 YEARS	13	5	1	1	0	20
61-90 YEARS	11	5	2	0	0	18
TOTAL	97	41	11	3	2	154

Table 3.2.43: Distribution of the respondents by age groups according to their opinion about how problematic is the lack of awareness of pedestrians and motorized vehicle drivers for people riding a bike at Hans Broges Gade.

Out of the Table 3.2.43, the SPSS calculated the Chi2 to be 18,552 with a degree of freedom (df) 20 and the missing values are 9. P is between 0,250 and 0,100, but close to 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT SIGNPOSTING AND ITS INTERPRETATION

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	43	15	8	3	2	71
FEMALE	54	27	3	0	0	84
TOTAL	97	42	11	3	2	155

Table 3.2.44: Distribution of the respondents by gender according to their opinion about how problematic is signposting and its interpretation at Hans Broges Gade.

Out of the Table 3.2.44, the SPSS calculated the Chi2 to be 2,254 with a degree of freedom (df) 3 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	TOTAL
PUBLIC SCHOOL	7	1	1	0	9
VOCATIONAL EDUC.	10	2	0	0	12
HIGH SCHOOL	15	4	1	0	20
SHORT HIGHER EDUC.	10	2	0	0	12
MEDIUM HIGHER EDUC.	40	10	1	0	51
LONG HIGHER EDUC.	46	6	1	1	54
TOTAL	128	25	4	1	158

Table 3.2.45: Distribution of the respondents by educational level according to their opinion about how problematic is signposting and its interpretation at Hans Broges Gade.

Out of the Table 3.2.45, the SPSS calculated the Chi2 to be 7,668 with a degree of freedom (df) 15 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	TOTAL
01-20 YEARS	9	4	0	13
21-30 YEARS	38	7	3	48
31-40 YEARS	24	6	1	31
41-50 YEARS	22	2	0	24
51-60 YEARS	17	3	0	20
61-90 YEARS	15	3	0	18
TOTAL	125	25	4	154

Table 3.2.46: Distribution of the respondents by age groups according to their opinion about how problematic is signposting and its interpretation at Hans Broges Gade.

Out of the Table 3.2.46, the SPSS calculated the Chi2 to be 8,041 with a degree of freedom (df) 10 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT SCENIC

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	33	23	11	3	1	71
FEMALE	61	16	5	1	2	85
TOTAL	94	39	16	4	3	156

Table 3.2.47: Distribution of the respondents by gender according to their opinion about how problematic is the scenic at Hans Broges Gade.

Out of the Table 3.2.47, the SPSS calculated the Chi2 to be 23,782 with a degree of freedom (df) 20 and the missing values are 4. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	9	3	1	1	0	9
VOCATIONAL EDUC.	9	3	0	0	0	12
HIGH SCHOOL	14	3	2	0	1	20
SHORT HIGHER EDUC.	12	0	0	0	0	12
MEDIUM HIGHER EDUC.	31	15	4	1	0	51
LONG HIGHER EDUC.	28	14	9	2	2	55
TOTAL	97	39	16	4	3	159

Table 3.2.48: Distribution of the respondents by educational level gender according to their opinion about how problematic is the scenic at Hans Broges Gade.

Out of the Table 3.2.48, the SPSS calculated the Chi2 to be 23,782 with a degree of freedom (df) 20 and the missing values are 4. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	8	3	1	1	0	13
21-30 YEARS	26	15	4	2	2	49
31-40 YEARS	13	11	5	1	1	31
41-50 YEARS	17	6	1	0	0	24
51-60 YEARS	18	1	1	0	0	20
61-90 YEARS	11	3	4	0	0	18
TOTAL	93	39	16	4	3	155

Table 3.2.49: Distribution of the respondents by age groups according to their opinion about how problematic is the scenic at Hans Broges Gade.

Out of the Table 3.2.49, the SPSS calculated the Chi2 to be 22,717 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND BIKING MORE OFTEN AFTER HANS BROGES GADE`S OPENING

	YES	NO	TOTAL
MALE	11	60	71
FEMALE	9	76	85
TOTAL	20	136	156

Table 3.2.50: Distribution of the respondents by gender based on starting to ride a bike more often, or not, after the opening of Hans Broges Gade.

Out of the Table 3.2.50, the SPSS calculated the Chi2 to be 0,833 with a degree of freedom (df) 1 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	YES	NO	TOTAL
PUBLIC SCHOOL	2	7	9
VOCATIONAL EDUC.	2	10	12
HIGH SCHOOL	4	16	20
SHORT HIGHER EDUC.	2	10	12
MEDIUM HIGHER EDUC.	5	46	51
LONG HIGHER EDUC.	6	49	55
TOTAL	21	138	159

Table 3.2.51: Distribution of the respondents by educational level based on starting to ride a bike more often, or not, after the opening of Hans Broges Gade.

Out of the Table 3.2.51, the SPSS calculated the Chi2 to be 2,462 with a degree of freedom (df) 5 and the missing values are 4. P is bigger than 0,250. Therefore, the variables are independent.

	YES	NO	TOTAL
01-20 YEARS	2	11	13
21-30 YEARS	9	40	49
31-40 YEARS	4	27	31
41-50 YEARS	1	23	24
51-60 YEARS	2	18	20
61-90 YEARS	2	16	18
TOTAL	20	135	155

Table 3.2.52: Distribution of the respondents by age groups based on starting to ride a bike more often, or not, after the opening of Hans Broges Gade.

Out of the Table 3.2.52, the SPSS calculated the Chi2 to be 3,204 with a degree of freedom (df) 5 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT STREET DESIGN AS INFLUENTIAL FACTOR TO RIDE A BIKE

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
MAN	11	18	17	21	4	71
FEMALE	21	20	21	16	7	85
TOTAL	32	38	38	37	11	156

Table 3.2.53: Distribution of respondents by gender according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.2.53, the SPSS calculated the Chi2 to be 3,920 with a degree of freedom (df) 4 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
PUBLIC SCHOOL	1	1	1	5	1	9
VOCATIONAL EDUC.	2	2	5	1	2	12
HIGH SCHOOL	4	8	4	4	0	20
SHORT HIGHER EDUC.	2	5	2	1	2	12
MEDIUM HIGHER EDUC.	11	12	15	11	2	51
LONG HIGHER EDUC.	12	11	12	16	4	55
TOTAL	32	39	39	38	11	159

Table 3.2.54: Distribution of respondents by educational level according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.2.54, the SPSS calculated the Chi2 to be 21,349 with a degree of freedom (df) 20 and the missing values are 4. P is bigger than 0,250. Therefore, the variables are independent.

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
01-20 YEARS	1	4	5	3	0	13
21-30 YEARS	10	12	9	15	3	49
31-40 YEARS	5	6	9	8	3	31
41-50 YEARS	7	9	4	2	2	24
51-60 YEARS	6	2	5	4	3	20
61-90 YEARS	2	3	7	6	0	18
TOTAL	31	36	39	38	11	155

Table 3.2.55: Distribution of respondents by age groups according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.2.55, the SPSS calculated the Chi2 to be 20,916 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent

SOCIO-DEMOGRAPHICS AND OPINION ABOUT HANS BROGES GADE`S DESIGN SOLUTION

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	2	15	39	13	69
FEMALE	1	28	34	22	85
TOTAL	3	43	73	35	154

Table 3.2.56: Distribution of respondents by gender according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Hans Broges Gade.

Out of the Table 3.2.56, the SPSS calculated the Chi2 to be 5,315 with a degree of freedom (df) 3 and the missing values are 9. P is between 0,250 and 0,100. Therefore, the variables are independent.

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	1	1	7	0	9
VOCATIONAL EDUC.	0	1	7	4	12
HIGH SCHOOL	0	8	10	2	20
SHORT HIGHER EDUC.	0	2	6	4	12
MEDIUM HIGHER EDUC.	1	16	21	12	50
LONG HIGHER EDUC.	1	15	25	13	54
TOTAL	3	43	76	35	157

Table 3.2.57: Distribution of respondents by educational level according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Hans Broges Gade.

Out of the Table 3.2.57, the SPSS calculated the Chi2 to be 16,504 with a degree of freedom (df) 15 and the missing values are 6. P is bigger than 0,250. Therefore, the variables are independent.

	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	5	7	1	13
21-30 YEARS	2	16	20	11	49
31-40 YEARS	0	10	14	7	31
41-50 YEARS	0	3	13	8	24
51-60 YEARS	0	4	10	5	19
61-90 YEARS	1	5	9	2	17
TOTAL	3	43	73	34	153

Table 3.2.58: Distribution of respondents by age groups according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Hans Broges Gade.

Out of the Table 3.2.58, the SPSS calculated the Chi2 to be 12,224 with a degree of freedom (df) 15 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

Figure 3.2.71: Cyclist meter at Hans Broges Gade.

3.3 case3
bicycle bridge bryggebro

3.3.1 COPENHAGEN

Copenhagen is the Danish national capital and the largest municipality of Denmark with a population of 503.699 inhabitants. The Copenhagen metropolitan area has a population of 1.901.789 inhabitants (Statistikbanken, 2010). The municipality is located in the islands of Zealand and Amager.

Figure 3.3.1: Geographical location of Copenhagen.

MUNICIPALITY VISION

Copenhagen has a vision to become World`s Eco-metropolis in year 2015 (Copenhagen Municipality, 2009b) and a list of thirteen goals has been set up to achieve this objective.

There are two goals directly related to cycling: to reduce carbon emissions by 20% from the amount emitted in 2005 and to become the world`s best city for cyclists.

In order to become the world`s best city for cyclists, the Copenhagen municipality defined three main objectives to be achieved before 2050: to have more than 50% of its population riding their bikes to go to work or to study, to improve the cyclists perception of safeness in the traffic and to decrease the number of injuries by half of the amount from 2007 (Copenhagen Municipality, 2009b).

Currently, 37% of Copenhageners that are working or studying commute riding a bike (Copenhagen Municipality, 2010b).

Moreover, the amount of serious injuries against cyclists has now gone from 118 in year 2005 to 121 in year 2008. Finally, 51% of the cyclists were feeling confident and safe while riding their bikes in year 2008 (Copenhagen Municipality, 2009b).

According to a traffic behaviour study conducted by Danish Technical University, 30% of all trips in Copenhagen are travelled on bike, 17% on foot, 16% in public transport and 30% in private cars (figure 3.3.2).

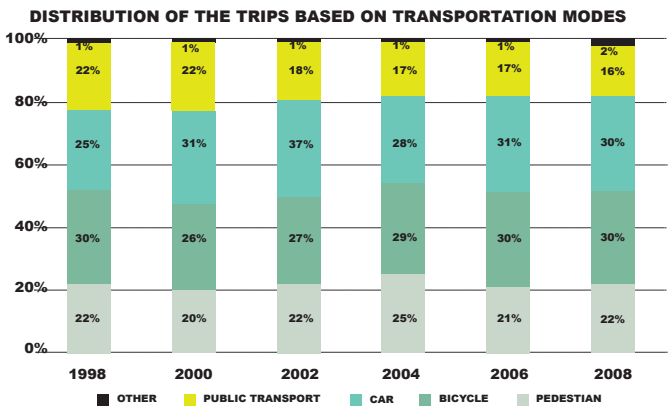


Figure 3.3.2: Distribution of trips according to transportation mode within Copenhagen municipality from 1998 until 2008. Source: Copenhagen Municipality

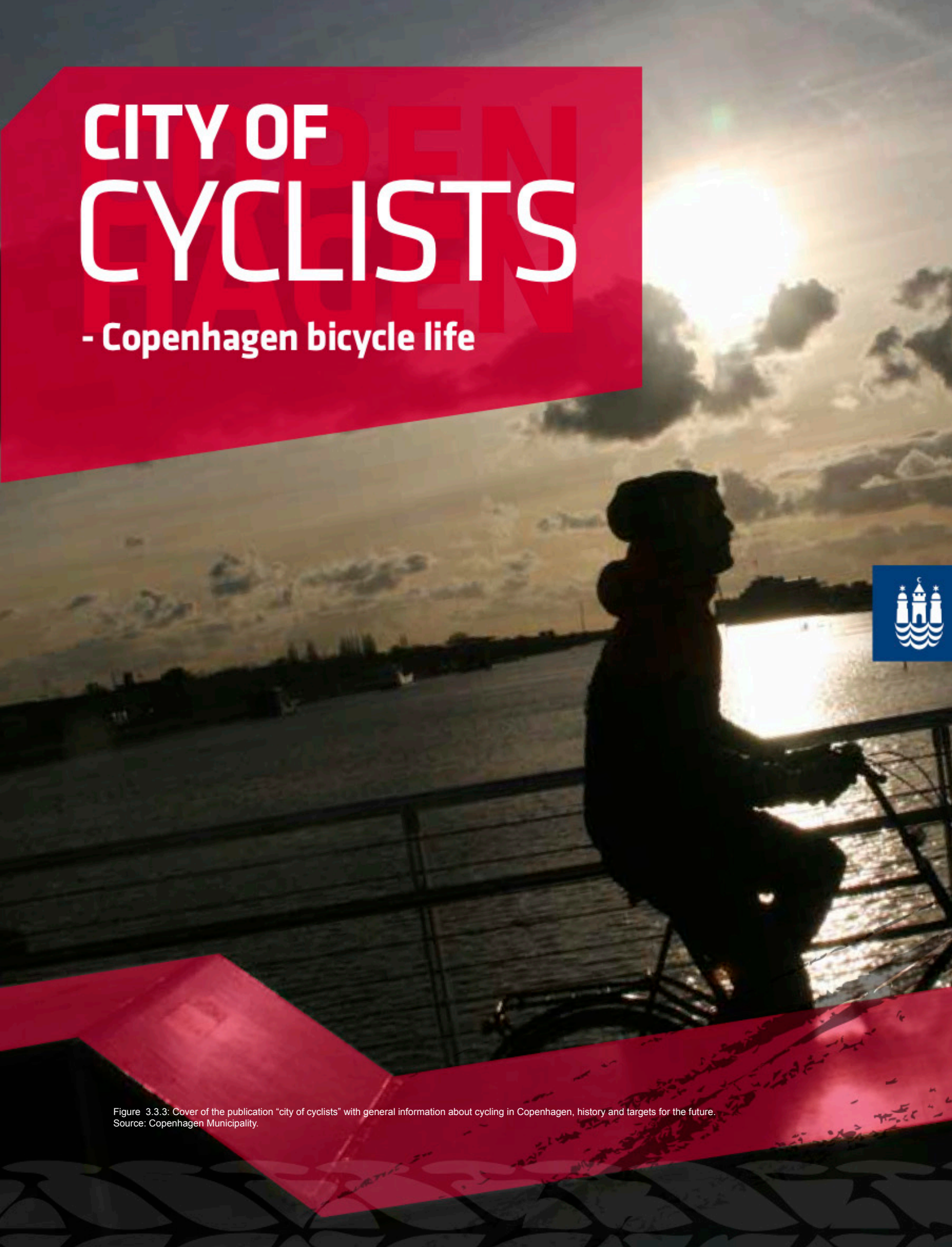


Figure 3.3.3: Cover of the publication “city of cyclists” with general information about cycling in Copenhagen, history and targets for the future.
Source: Copenhagen Municipality.

To improve the overall air quality of Copenhagen, a new law established Copenhagen as Environmental Zone. In 2008, the first step was took when the core of the city of Copenhagen and the municipality of Frederiksberg were defined as an Environmental Zone. In 2009, the Environmental Zone was extended to the entire Copenhagen municipality.

The Bike Secretary coordinates all the bicycle campaigns developed by Copenhagen Municipality. The Bike Secretary is part of the Centre for Traffic which is under the Technical and Environmental Department of Copenhagen Municipality.

To improve the discussions between the government and cyclists, there is a virtual community – www.ibikecph.dk – that functions as an arena to debate cycling in Copenhagen. Moreover, cyclists are asked to report any problems related to bike infrastructures – holes, cracks, etc. – and also to bring up suggestions about how to improve cycling conditions in Copenhagen.

Figure 3.3.4: Logo of the campaign Ibikecph.
Source: Copenhagen Municipality

23,966 residents of Copenhagen municipality participated in the national campaign “We bike to work”. Copenhagen municipality was the one with most participants and most cycled average kilometres per participant.

In both Summer 2009 and Spring 2010, a campaign against bike robbery took place in Copenhagen municipality. 5300 tracking chips were handed out, making possible to track stolen bicycles. Parking guards equipped with special scanners had registered 250 chipped bicycles of which two had been reported stolen.

Copenhagen Municipality has also recently created a board of two hundred children from six different schools named Children´s Traffic Council. The board has been created to hear bicycle ideas and problems from children’s perspective. The board had their first top meeting on September 22nd 2010 where major problems were discussed and ideas were proposed for the Technical and Environmental Secretary of Copenhagen.

In a study conducted by Copenhagen Municipality about safety when riding a bike, 43% of the respondents reported to feel unsafe because of other cyclists. In that context, Copenhagen Municipality and the Danish Cyclists Society made a campaign to address this problematic in September 2010. The campaign was based in two ideas: “to improve karma among cyclists” and “to think more about others when cycling”. A series of events took place from September 6th till September 12th 2010 – open-air theatre, lounge music in the streets, free apples and water for cyclists and guided cycle-trip.

Figure 3.3.5: Cyclists and pedestrians crossing Bryggebro bike bridge.

BICYCKLE NETWORK

Copenhagen municipality has 340 kilometres of bicycle tracks, 20 kilometres of bicycle lanes and 40 kilometres of green bicycle routes. At total of 503.699 inhabitants, Copenhagen has 0,8 metres of bicycle track, lane or trail per inhabitant.

Bryggebro is part of the University corridor – Universitetsruten – which is one of main corridors of the Copenhagen network of bicycles and footpaths.

The University corridor links the two sides of the Copenhagen harbour. It provides a shortcut for students travelling from Vesterbro to Amager where Copenhagen University campuses and the IT University in Ørestad are located. It also provides a fast connection for Amager residents to shopping facilities and the S-trains and for residents from Vesterbro to access green areas like Amager Park and Islands Brygge waterfront (CPHX 2009).

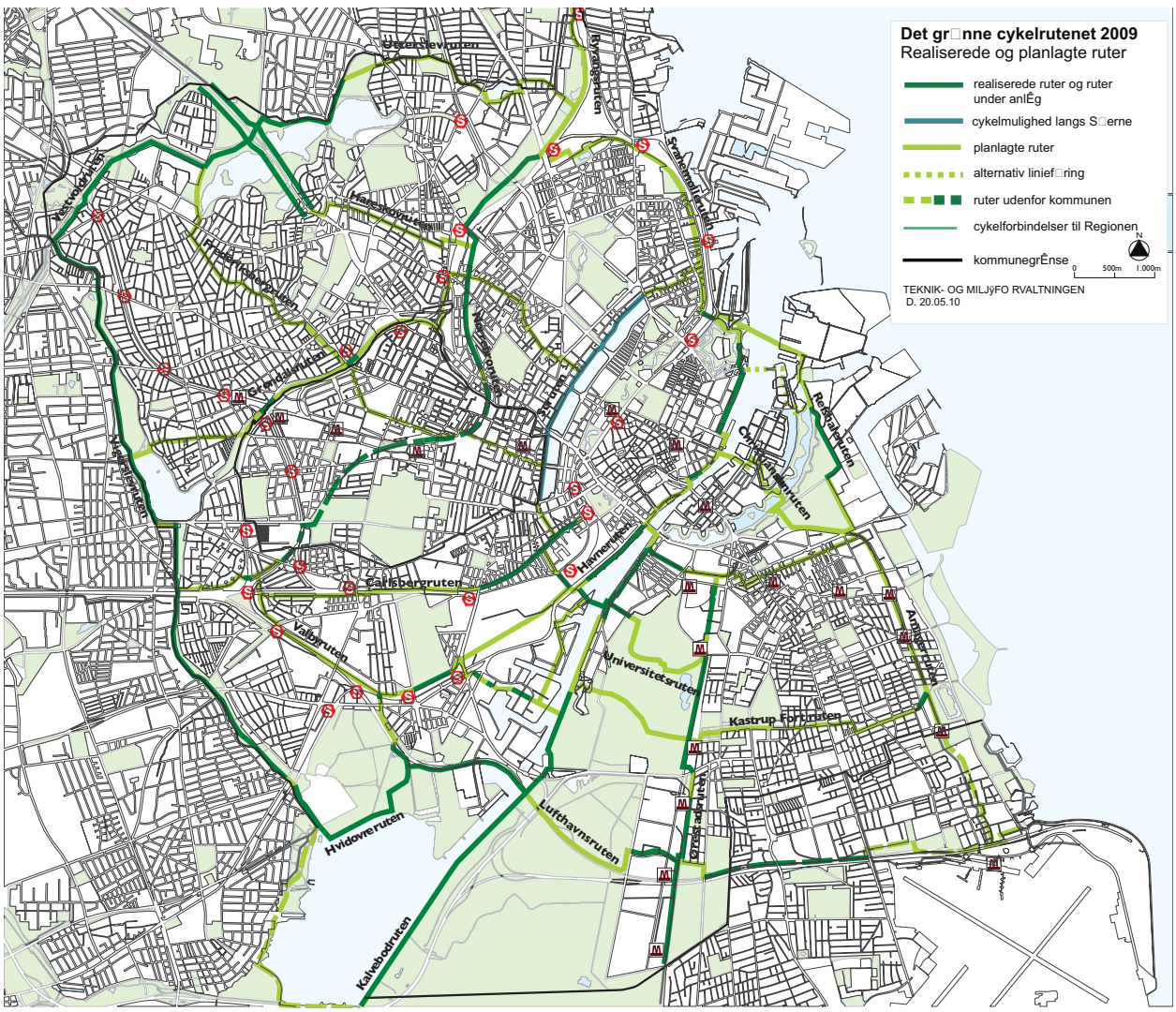


Figure 3.3.6: Copenhagen Bicycle Network. Source: Copenhagen Municipality.

Figure 3.3.7: The four bridges of Copenhagen Harbour. Modified from original picture from Google Earth

3.3.1 BRYGGEBRO

In 2006, it was inaugurated the first exclusively dedicated pedestrian and cyclist bridge of Copenhagen: Bryggebro. Bryggebro is a 190 metre long, six and a half metres wide, swing bridge connecting Kalvebod Brygge over Havneholmen to Islands Brygge (CPHX, 2009 and Grontmij-Carlbro, 2010).

Bryggebro links the two sides of Copenhagen Harbor and complements the other three connections across the Copenhagen harbour. Differently from the other connections, Bryggebro is exclusively dedicated for cyclists and pedestrians. On the north direction, there is Langebro – 1 kilometre from Bryggebro – and Knippelsbro – 2 kilometres from Bryggebro. On the south direction, there is Sjællandsbroen which is 3 kilometres distant from Bryggebro (Figure 3.3.7).

When inaugurating Bryggebro, the politician Klaus Bondam mentioned:

"To bridge the gap between the two wharfs is much more than the tangible construction, we use the term "to bridge the gap between" in many connections. To bridge a gap equals cooperation and dialogue, it equals overcoming gaps and obstacles – it is often about creating closeness and understanding between people…. It is my hope, that this new connection will give rise to new initiatives and that cooperation will occur – that this will also be a symbolic bridge between the two areas."

In 2000, Carl Bro and Sjælsø Group presented to the Copenhagen municipality a proposal to build up a bike bridge – named Bryggebro – at the Copenhagen harbour. Copenhagen municipality accepted the proposal and the project was then developed (Grontmij- Carlbro, 2010).

Bryggebro was designed by the architect office DISSING+WEITLING which won for this project the "Foreningen til hovedstadens forskønnelse" award 2006 (Dissing+Weitling, 2010).

Carl Bro functioned as consulting engineer for Copenhagen municipality and developed the technical drawings and carried the management and supervision of the construction (Grontmij- Carlbro, 2010).

The construction started in 2005 and was completed in September 2006. Bryggebro was officially opened on the 14th of September 2006. However, construction sites in the bridge surroundings and temporary accesses to the bridge were present until 2009 (Copenhagen Municipality, 2010c).

BEFORE AND AFTER

The construction of Bryggebro improved the accessibility between the two sides of Copenhagen Harbor.

THE COSTS OF BRYGGEBRO

The total amount spent with the construction of Bryggebro was 47.600.000 Danish krones.

The maintenance costs are expected to be 1.5% of the construction costs after 25 years of the opening. Until 2031, the maintenance costs are expected to rise every year 1/25 of 1,5% of the total cost of the bridge.

In addition, the operational costs of lighting, cleaning, anti graffiti, inspection of machinery are estimated to be 300.000 Danish krones per year (COWI, 2010 and CPHX 2009).

Figure 3.3.8: Bryggebro opening on the 14th of September. Source: Copenhagen Municipality.

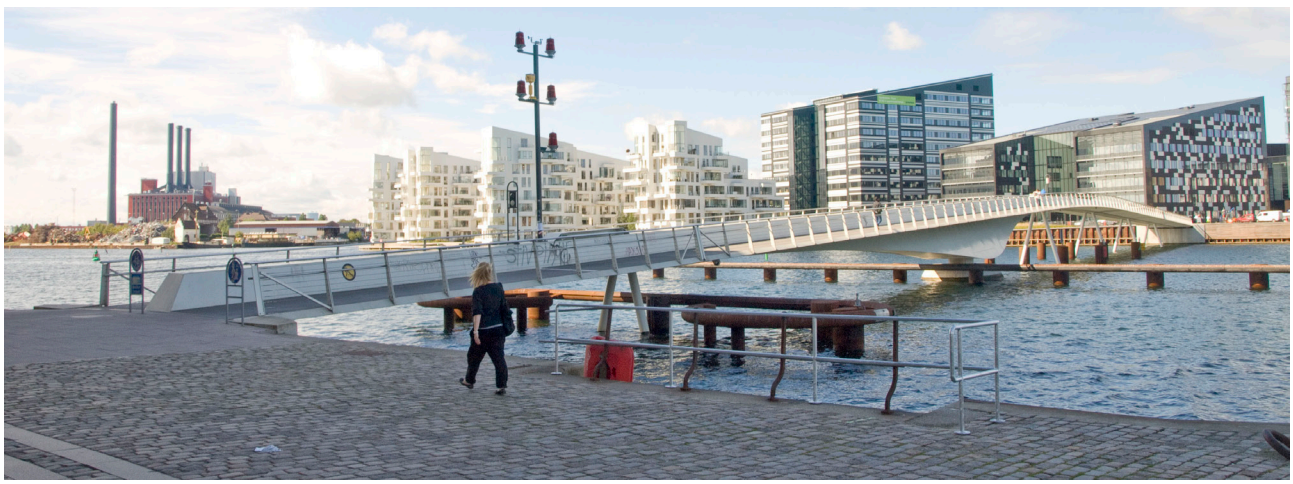


Figure 3.3.9: Image of Bryggebro from Islands Brygge side of the harbor.

DESIGN CHARACTERISTIC AND STREETSCAPE

DESIGN CONCEPT

Bryggebroen has an iconic character and functions as a landmark in the landscape. It is a 190 meter long by six and a half meters wide swing bridge connecting Kalvebod Brygge over Havneholmen to Islands Brygge (CPHX 2010, Grontmij- Carlbro, 2010). It is the first bridge built in Copenhagen Harbour in 50 years and the first bridge ever built in Copenhagen reserved solely for cyclists and pedestrians.

The bridge is divided equally between cyclists and pedestrians connecting workers and students travelling from the west part of the city to the Amager based side of Copenhagen. It has now made a statement in the area and has become an iconic bridge within the neighbourhood.

Figure 3.310: View of Havneholmen from Bryggebro.

Figure 3.3.12: View of Bryggebro from Island Brygge to the Havneholmen side.

Figure 3.3.11: Access to Bryggebro from Havneholmen.

Figure 3.3.13: Havneholmen and Bryggebro in the background.

Figure 3.3.14: Bryggebro in the foreground and Islands Brygge in the background.

TECHNICAL DRAWINGS

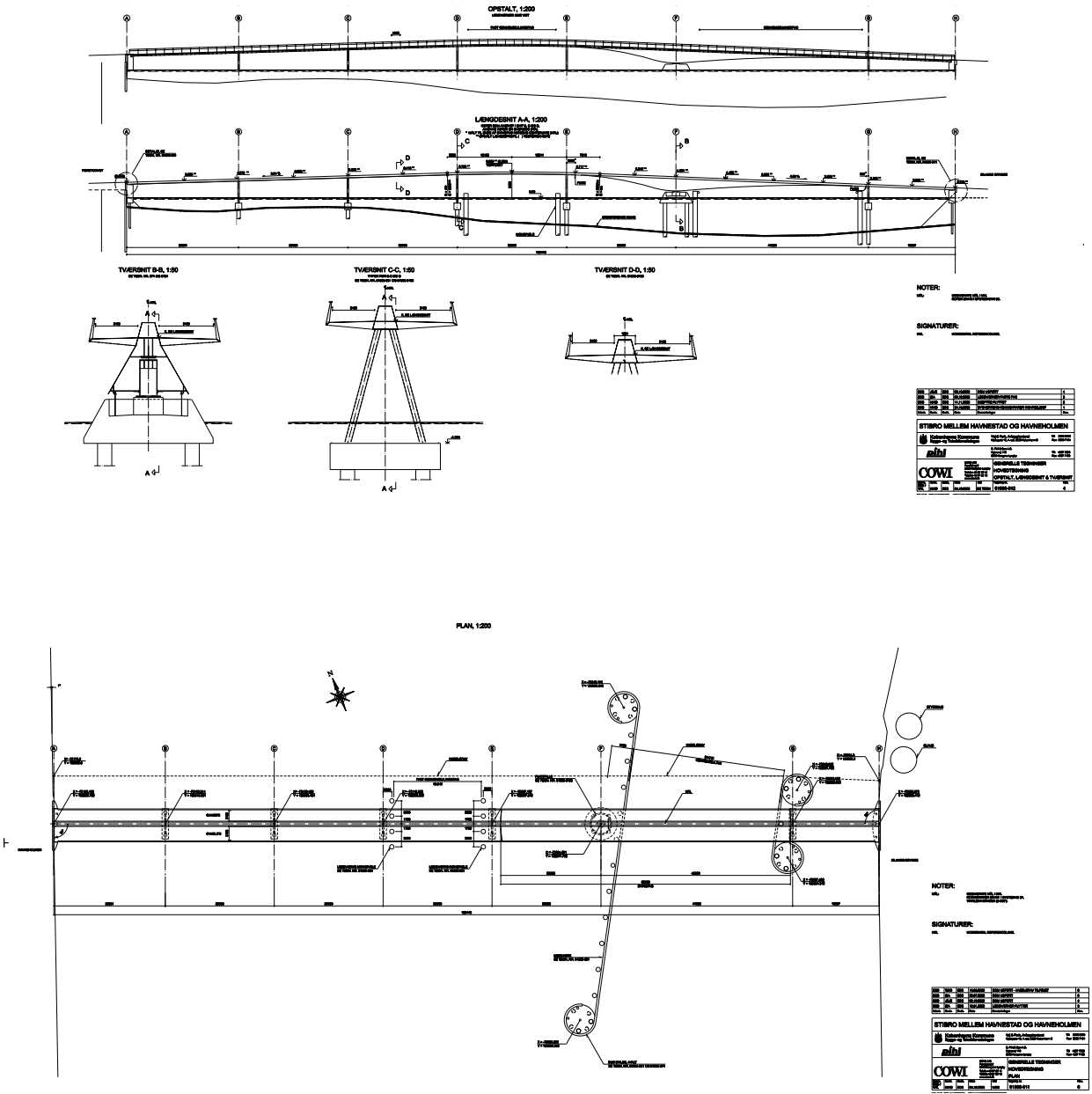


Figure 3.3.15: Plan and Section of Bryggebro. Source: Copenhagen Municipality.

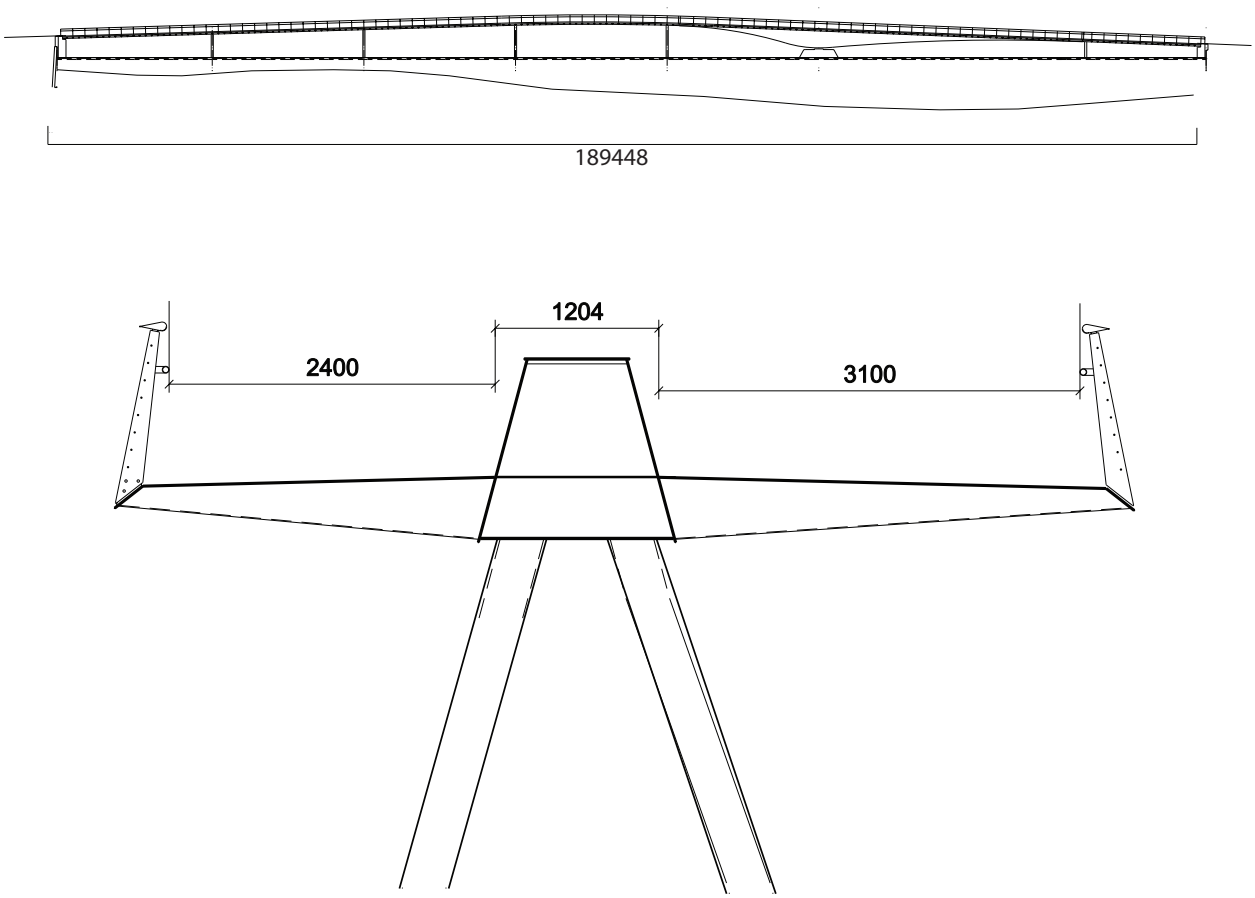


Figure 3.3.16: Elevation of the bridge seen from the side and cross section of the bridge. The pedestrian side on the left and cyclist on the right separated by a 60cm high 1.2 metres wide girder. Source: Copenhagen Municipality.

SURFACE AND FLOW STRUCTURE

The flow of cyclists and pedestrians at Bryggebro is going in both directions on either side of the bridge and at either ends of the bridge. Looking at a section of the bridge it is divided into three spaces. Beginning from the left there is a two way pedestrian path going in both directions, alongside this is an 80 centimetre high concrete girder that separates the two-directional cycling path from the walking path without obstructing eye contact between passing pedestrians and cyclists (Figures 3.3.17 and 3.3.18).

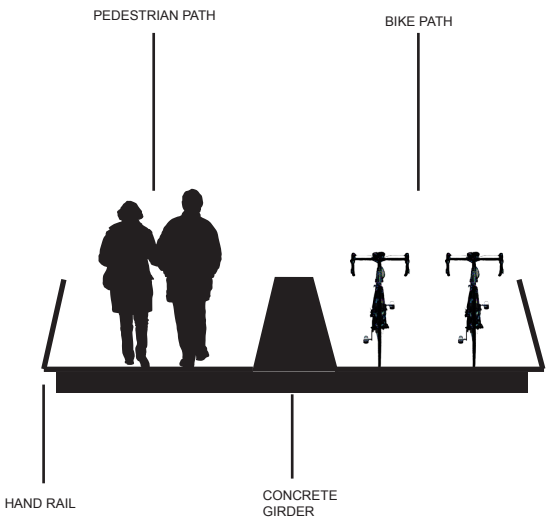


Figure 3.3.17: Bryggebro section.

PAVEMENT

The bridge itself is a combination of concrete, steel and asphalt. The colour of the cyclist and walking path is black asphalt which appears to be a light grey colour. The middle concrete girder and steel handrails are a very similar shade of grey. At one end of the exits the asphalt path meets a large granite paved rectangular area (Figure 3.3.19 and 3.3.20). At the other end the bridge meets a large granite paved footpath (Figure 3.3.22 and 3.3.23). To guide the cyclists in the correct lane a white dashed line has been placed down the centre of the path. Upon entering the bridge there are some metal path guides screwed into the concrete paving directing cyclists into the correct path.

Along the Islands Brygge side of the bridge there is a cobble stone road where everyone tends to ride along the smooth paved lanes to avoid the slow and rough ride along the cobblestones. This creates and defines a good separation between the walkers and the cyclists (Figure 3.3.21).

The surface on the bridge and on the entry and exits is in a good condition and there is no cracks or potholes which means that it is safe for cyclists and pedestrians to use. However when it rains the cobblestones and plastic path guides would become slippery for cyclists and possibly cause accidents.

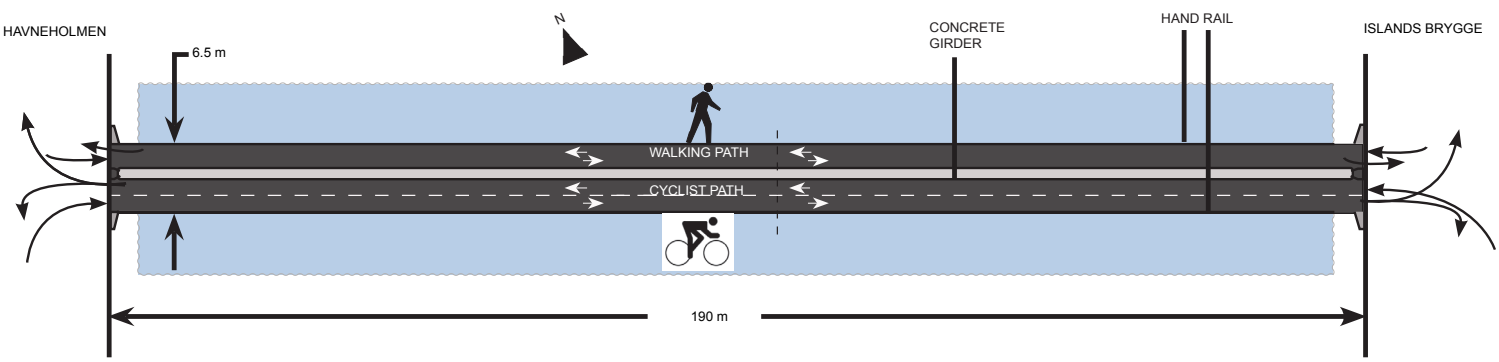


Figure 3.3.18: Bryggebro plan.

Figure 3.3.19: Access to Bryggebro from Islands Brygge.

Figure 3.3.22: Access to Bryggebro from Havenholmen

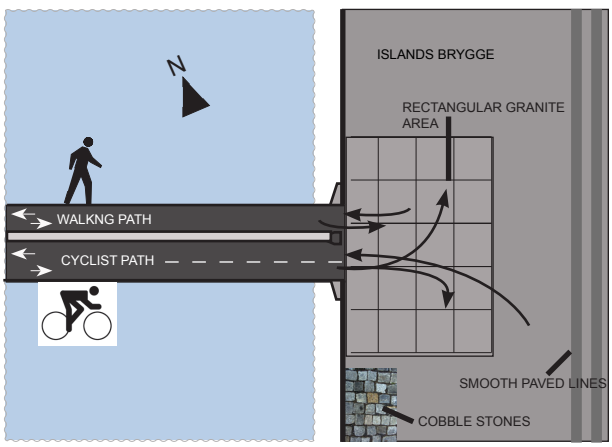


Figure 3.3.20: Access to Bryggebro from Islands Brygge side.

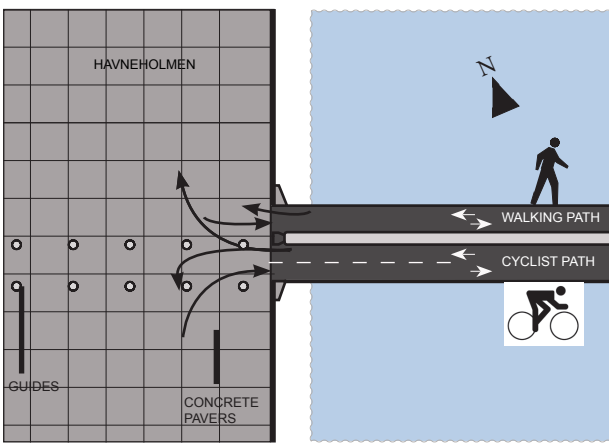


Figure 3.3.23: Access to Bryggebro from Havneholmen side.

Figure 3.3.21: Islands Brygge promenade

HIERARCHY OF USERS

The users on the bridge have equal priority for crossing the bridge. However the cyclists have slightly more space which they require to ride comfortably opposite each other (Figure 3.3.24).

The cyclists also demand more space at each end of the bridge as they are consistently swooping in and out of the bridge at high speeds whilst navigating around pedestrians. This can cause some conflicts and clashing between pedestrians and cyclists (Figure 3.3.25).

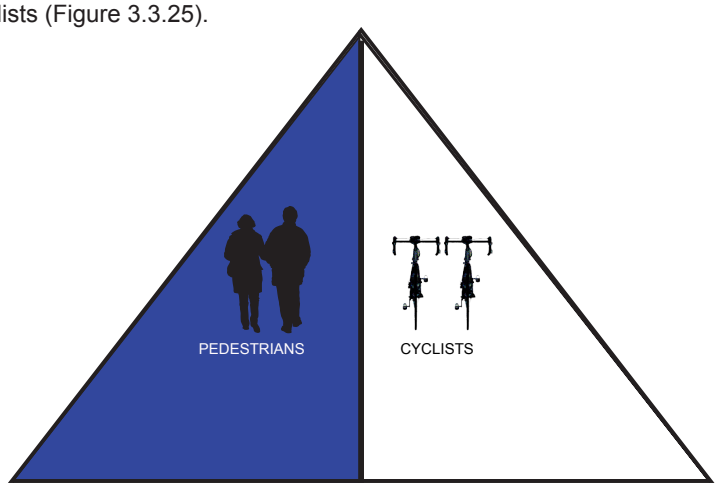


Figure 3.3.24: Hierarchy between transport modes.

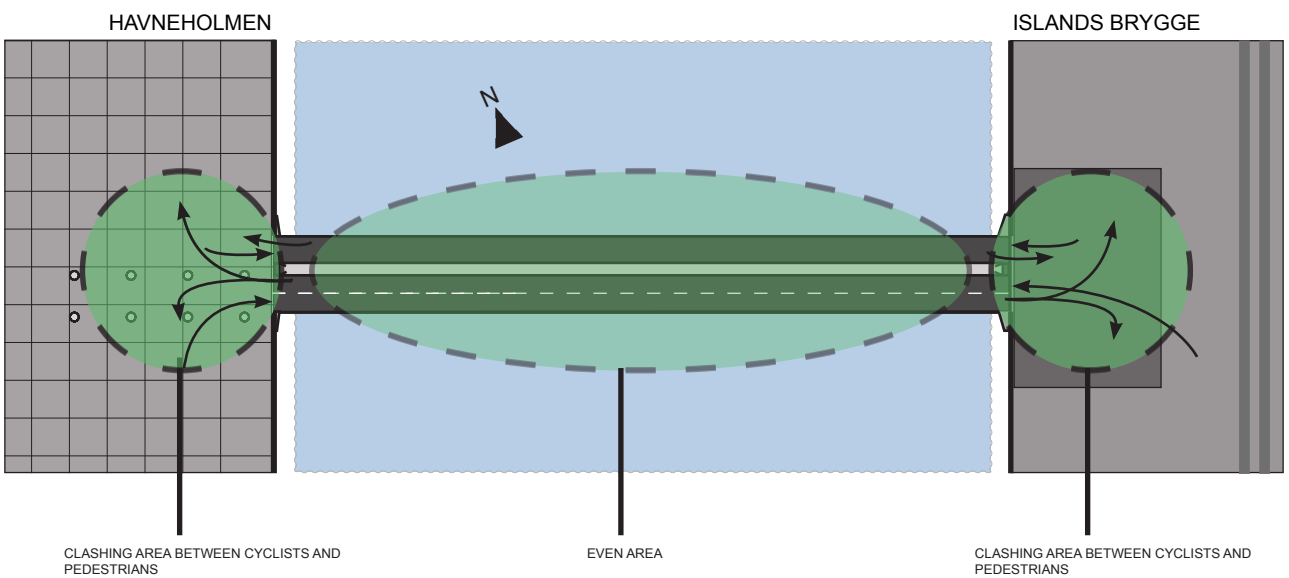


Figure 3.3.25: Bryggebro plan and representation of transport mode conflicts.

VELOCITIES

The bridge has high and low peaks of traffic during the day. Peak hours where the bridge is most populated is in the morning from 7am to 10am when people are on their way to work or school (Figure 3.3.26). Other peak hour times are in the afternoon/evening from 4pm till 7pm when people are on their way home from work and school. During these times it is more difficult for the cyclists to go very fast as the bridge is crowded. However during off peak times cyclists can go faster as there is less traffic, these times are from 10am till 3pm, 7pm till 7am and on the weekends (Figure 3.3.27).

Some problems can arise when exiting the bridge onto the Islands Brygge side. The bridge becomes quite steep allowing cyclists to gain a lot of speed making exiting the bridge somewhat unsafe. This becomes a problem as they then have to make a sharp turn left or right into an on coming traffic of pedestrians and cyclists entering the bridge. Pedestrians walking do not present any problems to the infrastructure as they are moving slowly but they do have to pay a lot of attention of fast moving cyclists at each exit as do pedestrians running (Figure 3.3.28).

Figure 3.3.26: Joggers and cyclists crossing.

Figure 3.3.27: Cyclists riding fast out of the exit of the bridge.

Figure 3.3.28: Walkers have to pay attention from fast moving cyclists exiting.

PARKING

There is no illegally parked bikes at Bryggebro. However, they can be found in the surrounding area (Figures 3.3.29 and 3.3.30).

Figure 3.3.29: A stray bike parked nearby the bridge.

Figure 3.3.30: Bikes parked under stairs.

STREET FURNITURE

There are no benches or planters on the bridge. Close to the exits of the bridge bins can be found.

STREET LIGHTS

To avoid people feeling unsafe when crossing the bridge at night the bridge is lit up on the paths of the bridge as well as on the bottom of the bridge, guiding cyclists and pedestrians across the bridge in the safest manner possible (Figure 3.3.31 and 3.3.32). The bridges central spine, the girder down the middle, is illuminated by light fixtures incorporated into each of the hand railings. The built in light in the handrail was chosen as opposed to light poles or posts in order to provide an unobtrusive, hidden illumination source. Besides the white light illuminating the top of the bridge there is a coloured light scheme beneath the bridge.

In the lead up to the bridge along the side of the cobblestone road there are also lamp posts guiding you to the bridge (Figure 3.3.33). Lighting up the bridge not only creates a safe environment for users but also looks pretty glowing and reflecting across the water. The bridge is not lit up at the exits, which could prove to be dangerous for some night users (Figure 3.3.34).

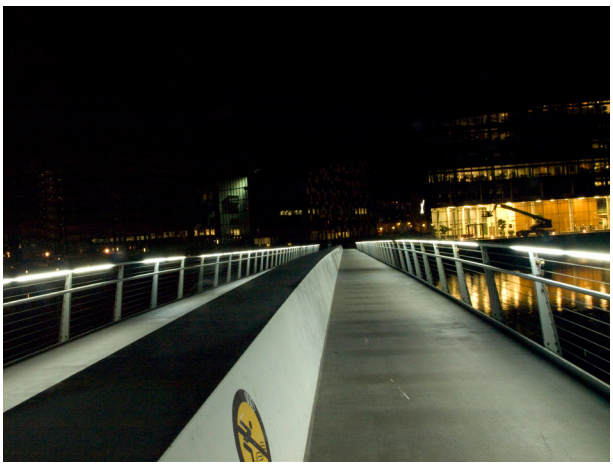


Figure 3.3.31: Bryggebro illumination.

Figure 3.3.32: Bryggebro illumination.

Figure 3.3.33: Lamp posts.

Figure 3.3.34: Bridge exit in the night.

SIGNAGE

There is signage on both sides of the bridge indicating where the walkers path entrance is and where the cyclists entrance path is, although both utilise good and bad approaches to this communication.

On the Islands Brygge side there is one sign in the middle indicating that cyclists enter to the left of the sign (Figure 3.3.35). On the same side of the bridge to the right there is a sign indicating that walker's enter the bridge to the left of the sign (Figure 3.3.36). This can appear somewhat confusing to some pedestrians and cyclists as you can see in Figure 3.3.35, where a cyclist has taken the wrong path and has had to turn backwards to the correct path.

However the Havneholmen side of the bridge utilises a good example of signage, placing the cyclist and walker signs either side of the bridge clearly indicating and defining the entrances. (Figure 3.3.37). These signs also require maintenance, as they are often damaged through graffiti as you can see in Figure 3.3.38 where the arrow has been sprayed over.

Figure 3.3.35: Cyclist has wrongly entered into the pedestrian lane.

Figure 3.3.36: Access from Islands Brygge side.

Figure 3.3.37: Bryggebro access from Havneholmen.

Figure 3.3.38: Damaged sign.

PUBLIC ART OR OTHER UNIQUE FEATURES

Graffiti can also be found along the bridge, however it seems to be more of an eye sore than adding character to the bridge (Figure 3.3.39 and 3.3.40).

Figure 3.3.39: Graffiti at Bryggebro.

Figure 3.3.40: Graffiti at Bryggebro.

Love padlocks are a custom by which sweethearts affix padlocks to a fence or similar public fixture to symbolise their love. The most common place of love padlocks are on the railings of the bridges. It is suggested that the custom of 'locking a padlock and throwing away the key' probably originated in China. Many can be seen along Bryggebro giving the bridge some cultural and artistic character.

Figure 3.3.41: Love padlocks


Figure 3.3.42: Love padlocks

Figure 3.3.43: Love padlocks

Figure 3.3.44: Love padlocks

Figure 3.3.45: Love padlocks.

CROSSINGS, INTERSECTIONS

The main intersections and crossings occur at the either end of the bridge where the bridge meets the rectangular granite landing which borders a cobblestone road or a granite tiled surface. The intersections function as shared-use spaces. The solution brings conflicts between cyclists and pedestrians. The conflicts are mostly caused by the higher speed of cyclists when approaching the shared -use area.

Figure 3.3.46: Intersection at Islands Brygge.

Figure 3.3.47: Intersection at Havneholmen

ACCESSIBILITY

The majority of the problems experienced were in the accessibility of driving to the bridge and entering it. As slow moving pedestrians mixed with fast moving cyclists could create conflicts at the entry and exits (Figure 3.3.48, 3.3.49, 3.3.50).

The entry point of the bridge on both sides is made as a shared space. The shared spaces include multiple directions for cyclists and pedestrians (figures from file). The bridge has been built to let small boats, canoes and the harbour ferries pass underneath it. This creates a need for free height underneath the bridge and this has been resolved by creating a rise from both sides towards the middle of the bridges. This makes people exiting the bridge in both directions drive in high speeds from a dedicated bike lane into the shared spaces at the end of both sides of the bridge.

This creates situations where cyclists have to react quite quickly to avoid collisions with other drivers, and makes pedestrians vunerable to enter and exit the bridge.

The landing on the Amager side is a shared space on a field of approximately 7x14 meters paved with granite tiles. Because of its relatively small size people make their turn towards their new direction within the field. Two directions of dedicated bicycle path on the bridge spreads to four directions on the small shared space landing. This creates crossing of cyclists with no indication of where to drive. On top of that there is a layer of pedestrians entering and leaving the bridge and strolling along the recreational grounds of Islands Brygge.

Furthermore avoiding collisions with other cyclists and pedestrians, the cyclists also have to read the sign of where to drive. The signs are not oriented towards the cyclists from their entrance paths on the Amager side. They are oriented out in direction of the shared space. Where cyclists has to do a 90 degree turn in only a few metres while still observing other cyclists, it can be hard to read the signs at the same time. For most it was not a problem, probably as a result of having used the facility before, but for some it resulted in choosing the wrong side of the bridge and having to drive back.

Figure 3.3.48: Bryggebro's access at Islands Brygge side.

Figure 3.3.49: Bryggebro's access at Islands Brygge side.

Figure 3.3.50: Bryggebro's acces at Islands Brygge side.

There is a connection between the shared space landing at the end of the bridge and surrounding bicycle network in the promenade paved with cobblestone. Two narrow paths have been inserted into the cobble stone to make it more accessible for cyclists, but these paths were probably not designed to handle the amount of flow over bridge.

The cobble stone pavement limits cycling to the two paved lanes. These two tracks are shared between cyclists, people with crafts, woman in high heels, disabled people and the elderly with walkers. Furthermore they are placed very close to one another making it difficult to share a path together (Figure 3.3.51).

Cyclists trying to overtake other cyclists on these paths are forced onto the cobblestones, this creates a bumpy ride and whilst observing quite a few chains fell off bikes.

When leaving the two narrow paths to enter the connected bicycle networks, the most commonly used route is to cross a privately owned parking lot. The parking lot is paved with gravel stone (Figure 3.3.53). A temporary asphalt path has been constructed in the middle of the parking lot to increase the accessibility. People tend to drive the shortest way across the gravel stone parking lot when they are leaving from the bridge, while people approaching the bridge tend to use the asphalt path. That makes good sense, as the asphalt path is connected to the bicycle tracks in the facing street.

Figure 3.3.51: Cyclists on the smooth paved lanes.

Figure 3.3.52: Pavement detail fron Islands Brygge side.

Figure 3.3.53: Privately owned parking lot.

When entering the side of Havneholmen there is a choice of two routes to go on from (Figure 3.3.54 and 3.3.55). A route around Fisketorvet shopping center on a municipal road and a route passing by in front of it in private land. A lot of people are using the road in front of Fisketorvet as a shortcut through the site even though the path brings a series of obstacles. The shortcut is paved with stones and shared with pedestrians. On the way it has two 90-degree turns. With no directions or marked roadways, the cyclists have to be careful not to collide with other cyclists or pedestrians.

The shortcut ends in a staircase connecting Havneholmen to Dybbølsbro (Figure 3.3.54). In a counting conducted on the municipality of Copenhagen on Monday September 7th of September 2009 they found that 3208 would drag their bicycles up and down the stairs. The study does not include how many of these people actually travel over the bridge, but we assume that this was the purpose for the majority of the bikers based on our observations.

The other route around Fisketorvet is around 800 metres long compared to the shortcuts around 300 metres (Figure 3.3.55). That is approximately 2 minutes extra when travelling at 16km/h, but this is relative as the cyclist has to ride up a 250 metre slope to reach same destination as you would reach when using the stairs. This physical challenge could be the reason why so many are willing to step off their bikes and drag them up the stairs (Figure 3.3.54 and 3.3.55).

For people travelling in southern direction this route is easy to use, but for people traveling the same destinations that the shortcut is fitted for it makes. The route is on proper road with asphalt pavement. It has green grass and trees under way and great view conditions. The road is constructed to be a distribution road for buildings in Havneholmen. Cargo bikes are forced to take this route, as they are not suited for dragging up and down stairs (Figure 3.3.57 and 3.3.58).

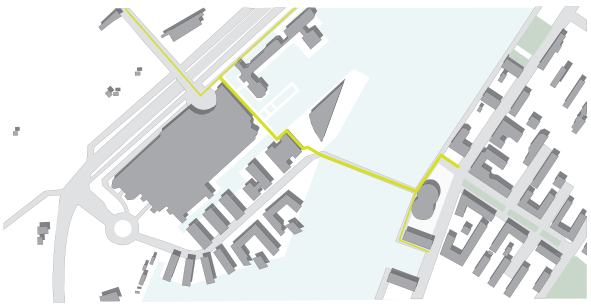


Figure 3.3.54: Bike route linking to the staircases.

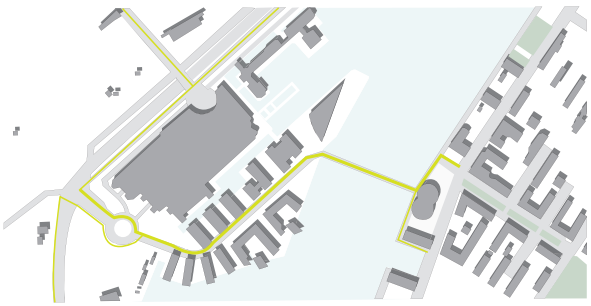


Figure 3.3.55: Longer bike route avoiding staircases.

On the Havneholmen side of the bridge there is a granite tiled area in front of a cooperate headquarters. The area is privately owned with the entrance to the bridge being privately funded (Figure 3.3.56). This solution could indicate that a higher emphasis has been set on aesthetics for its own headquarter than on creating good bicycle conditions.

The bicycle path indicates that there is only one way out of the area one leading to the commercial co financer of the bridge and the shopping center Fisketorvet. People driving to the road around Fisketorvet has to cross this main flow with no indication of direction marked or entrance points.

Figure 3.3.56: Bryggebro entering from the Havneholmen side.

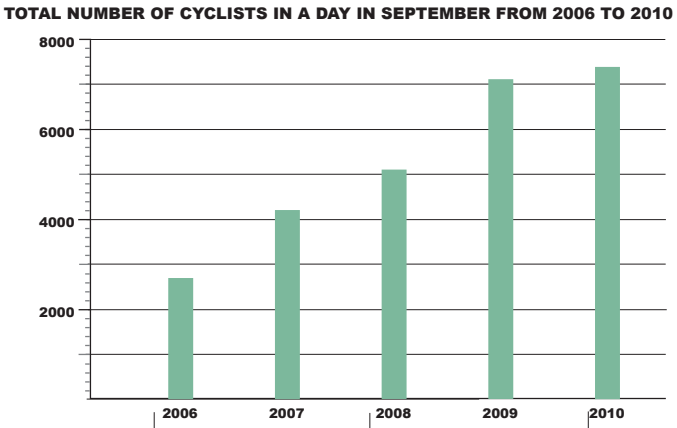
Figure 3.3.57: Foot bridge to make the trip shorter.

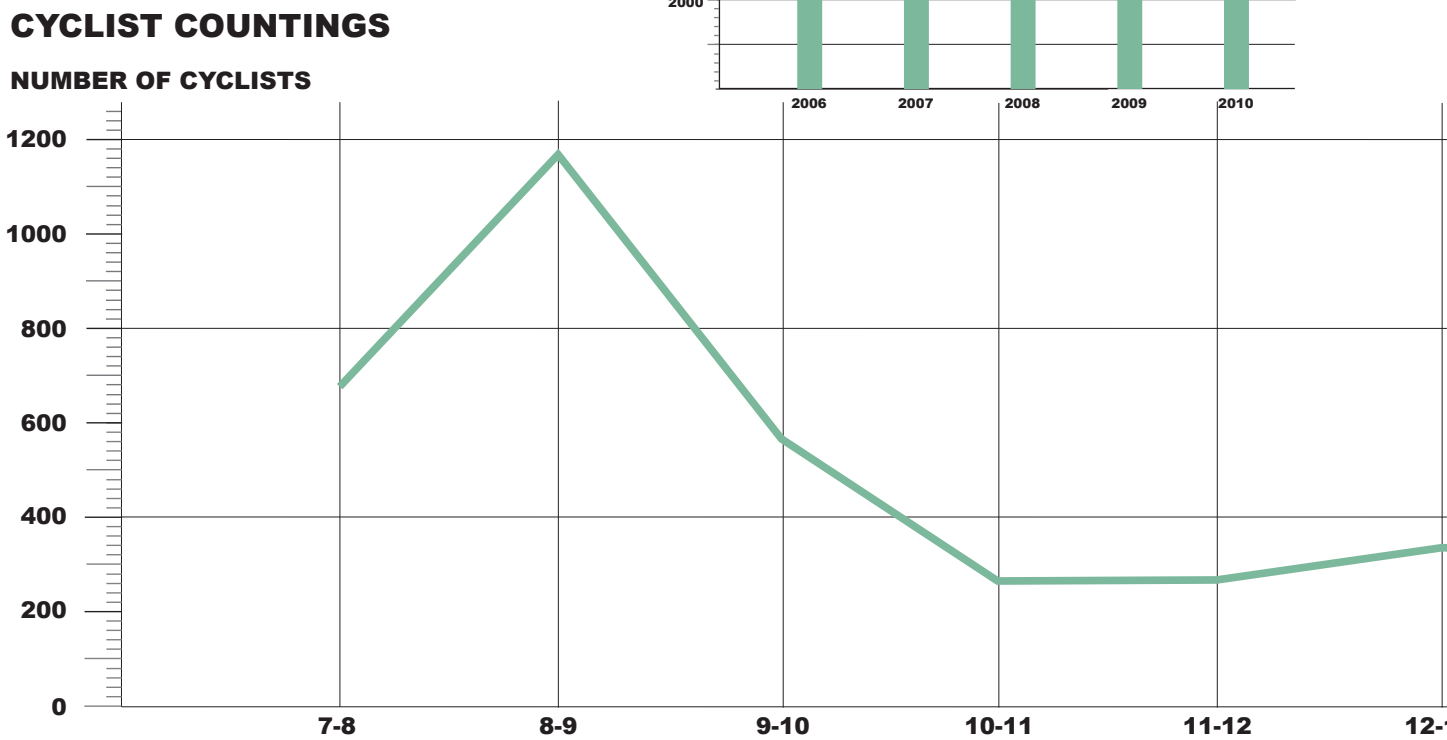
Figure 3.3.58: Cyclists pushing their bikes up the stairs.

BUILT ENVIRONMENT AND USES

The surrounding areas of Bryggebro includes a mixture of residential and commercial buildings. The Islands Brygge mostly residential side comprises of mostly urban living with some commercial buildings. However the Havneholmen side is residential and commercial comprising of mostly commercial buildings and Dybbølsbro which is one of the main train stations in the core of the city (Figure 3.3.59).

Figure 3.3.59: Built environment surrounding Bryggebro on the Islands Brygge side.





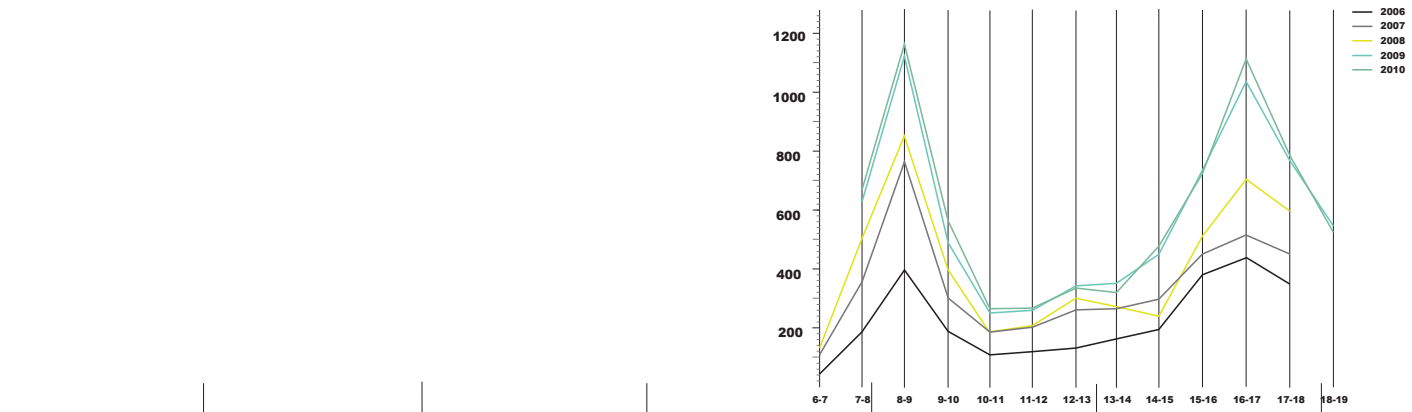
7-8
700 bikes

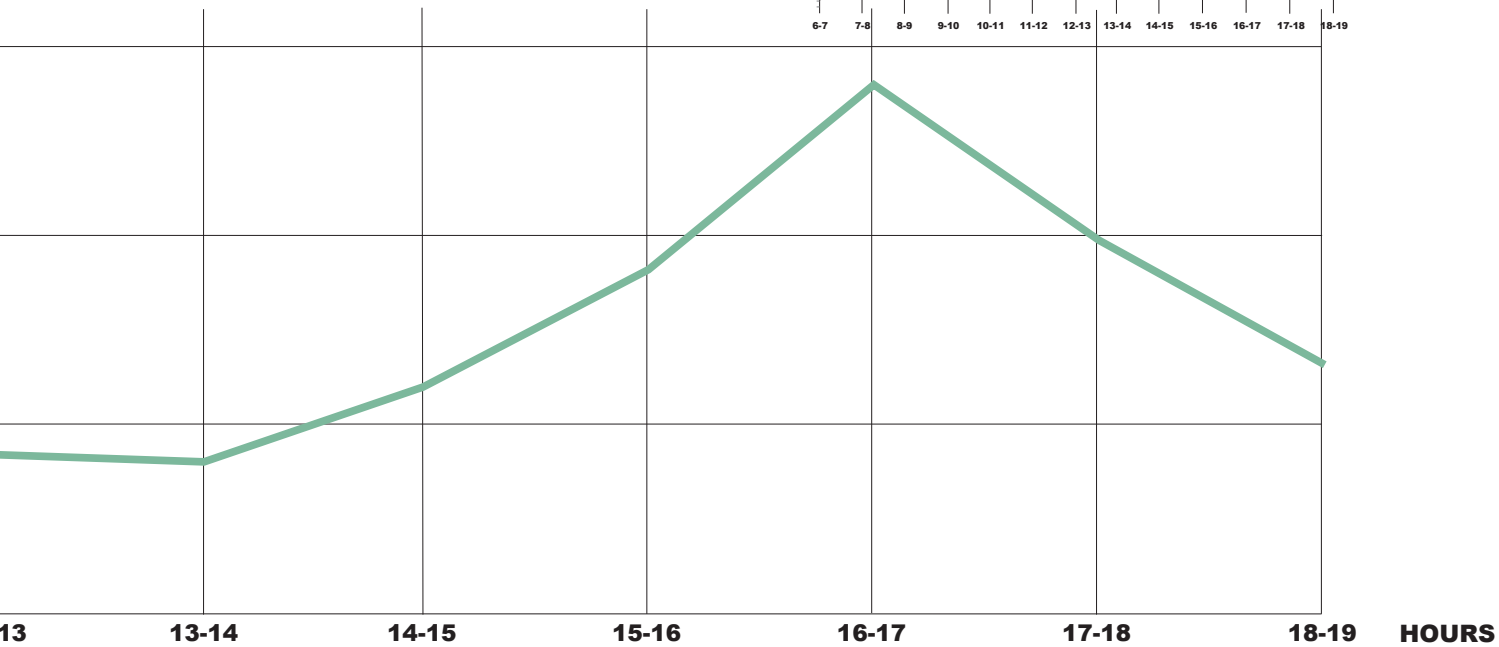
8-9
1190 bikes

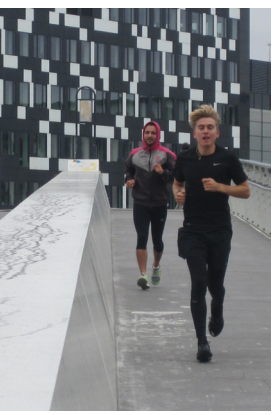
13-14
350 bikes

Figure 3.3.60: Cyclist countings. Source: Copenhagen Municipality.

TOTAL NUMBER OF CYCLISTS PER HOUR IN A DAY IN SEPTEMBER FROM 2006 TO 2010







16-17
1150 bikes

18-19
500 bikes

THE WEB SURVEY

The web survey analysis is divided in four sections. Firstly, main findings are presented. The second section describes the spatial distribution of the residential location of the respondents. Thirdly, a descriptive statistic to analyze all the answers. In search of finding relationships between socio-demographic variables and the web survey answers, the last section presents a statistical analysis using the Chi2 test.

A total of 290 individuals that were riding a bike at Bryggebro on the 1st of September answered the questionnaire in the period between September 1st and October 31st.

Based on the count done in Copenhagen municipality in September 2009, there are an average of 7352 bicycle trips at Bryggebro from 7am until 7pm from both directions on weekdays. Estimating that 35% of these cyclists ride their bikes at least once per day in the infrastructure, it was stipulated that a total of 4778 individuals ride a bike at Bryggebro per day.

A total of 3020 flyers were distributed to individuals riding their bikes in the infrastructure from 7am until 7pm and from these a total of 290 answered the questionnaire.

Based on these figures, the respondents represents 6,06% of the total of individuals riding a bike per day in the infrastructure and 9,60% of individuals that collected the flyer on September 1st whilst riding a bike in the infrastructure.

MAIN FINDINGS

In conclusion the data from the survey reveals a picture of Bryggebro as a piece of infrastructure used by the majority of the cyclists for commuting to work (69%) and to study (8%). However, the main purpose of the trips from the left 23% is very diverse (19% shopping, 3% recreational, 6% visiting family and friends and 4% others). The figures are directly connected to the built environment were the infrastructure is located – a main streets in a residential based neighbourhood next to the city core.

After the Chi2 test was applied, the results highlight that most of the answers do not have a relation with socio-demographic conditions. However, some representative relations between the independent variables – gender, age and educational level – and the questionnaire answers were identified.

There is a relation between the main trip purpose when riding a bike at Bryggebro and age and educational level. The impact of the opening of Bryggebro in the individuals decision to ride a bike more often has also a relation educational level. Finally, educational level also seems to have a relation with the individuals` answers on regards their opinion about conflicts between the different transportation modes in the infrastructure.

Finally, there is a relation between gender and individuals`s opinion about the lack of awareness of pedestrians for cyclists in the infrastructure.
The following section provides the actual data for each of the questions asked.

RESIDENTIAL LOCATION OF RESPONDENTS

The residential addresses of the respondents – individuals riding a bike at Bryggebro on September 1 – were registered and geo-referenced in order to produce a map (see Figures 3.3.60 and 3.3.61). According to the Table 3.3.1, the majority of the respondents (59,7%) live within a radius of 2 kilometres and 90% of them living within 5 kilometres distance from the infrastructure.

Respondents living more than 5 kilometers from the infrastructure correspond to 10% of the total and from this amount 30% are living more than 10 kilometres away of the infrastructure.

	0-1 KM	1-2 KM	2-3 KM	3-4 KM	4-5 KM	5-10 KM	10-15 KM	15-20 KM	20 K
NO. DWELLINGS	95	78	43	29	16	19	5	4	1
% DWELLINGS	32,8%	26,9%	14,8%	10,0%	5,5%	6,6%	1,7%	1,4%	0,3

Table 3.3.1: Absolute and percentage distribution of respondents according to the distance of their residential location from Bryggebro.

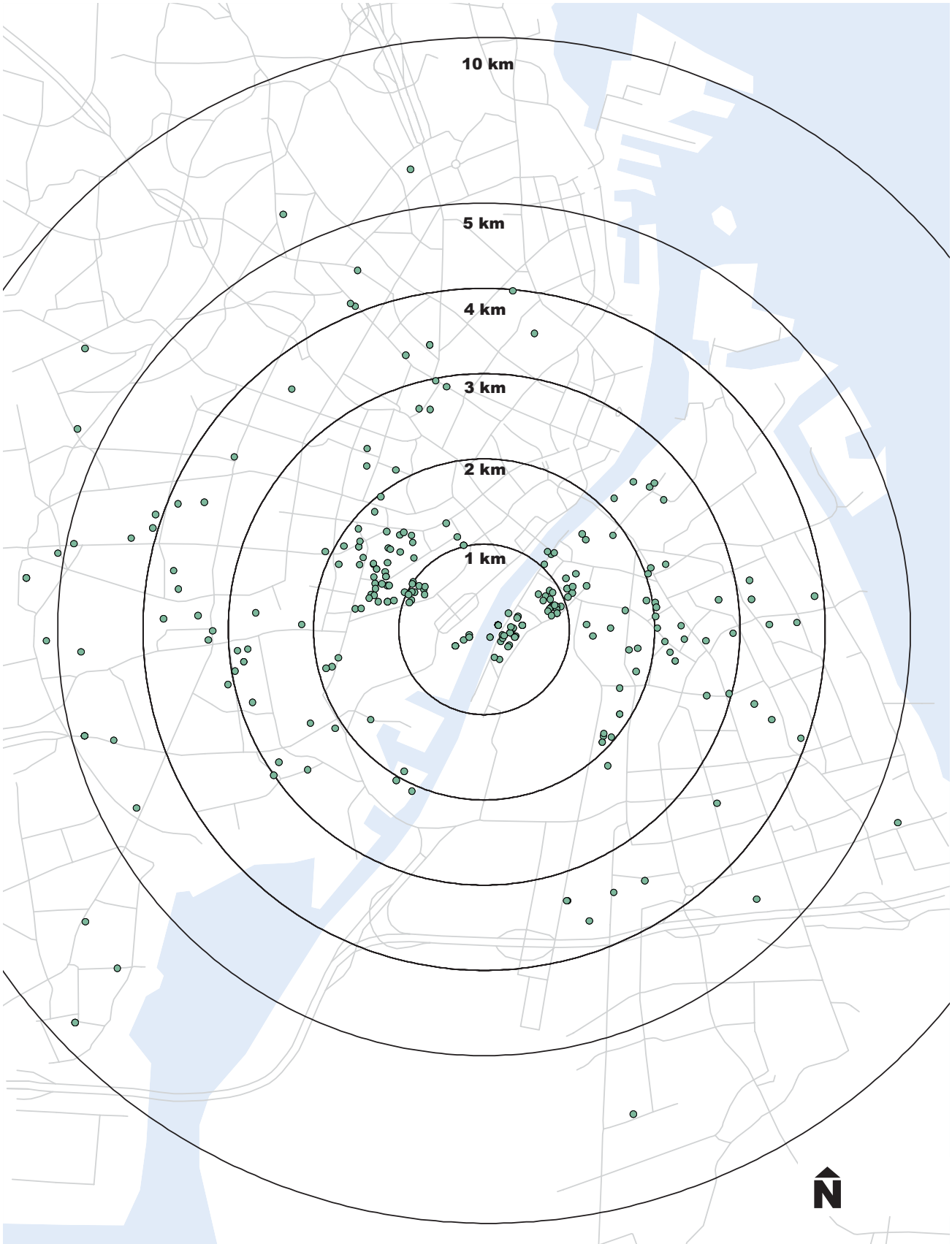


Figure 3.3.61: Spatial distribution of the respondents according to their residential location – 5km map.

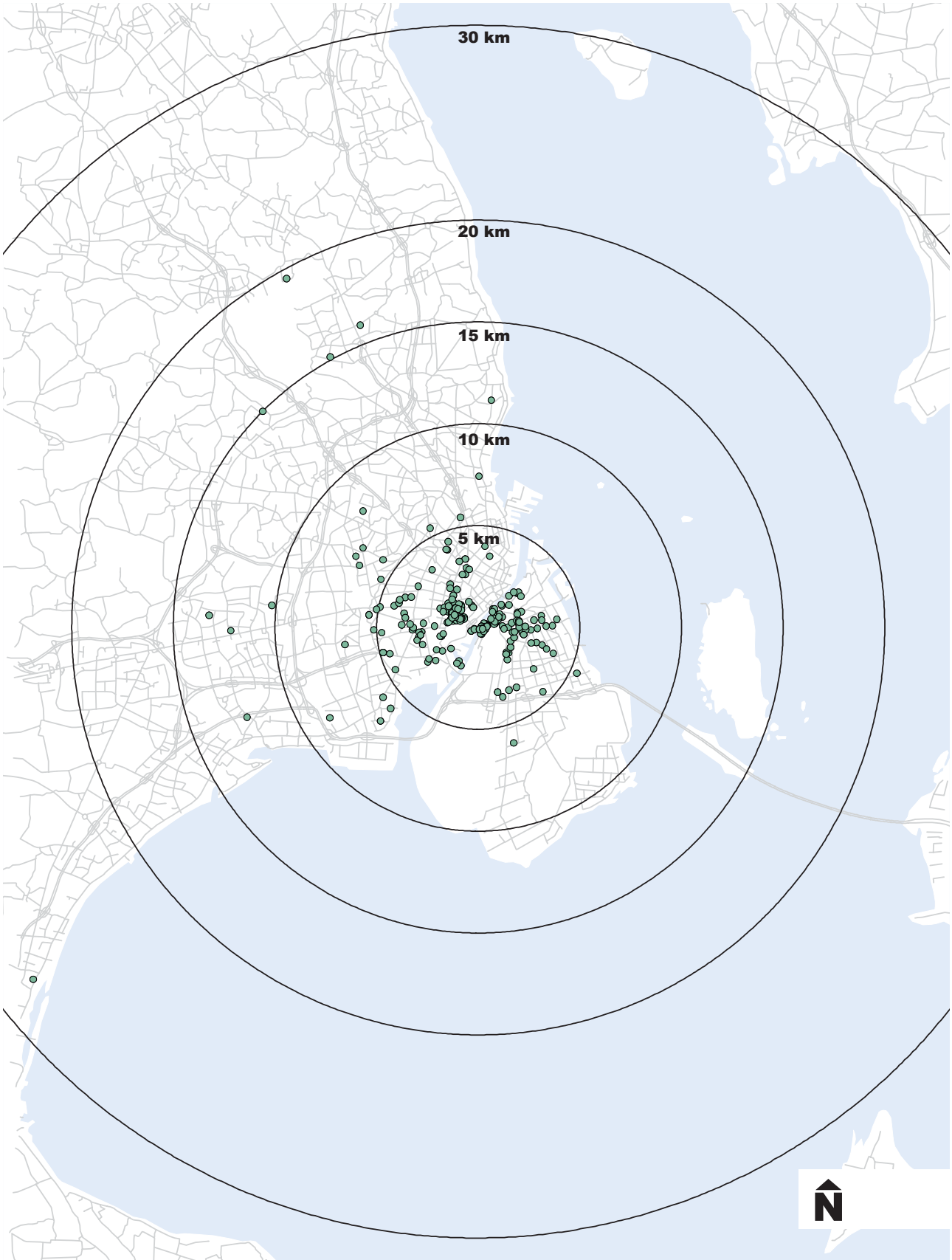


Figure 3.3.62: Spatial distribution of the respondents according to their residential location – 20km

DESCRIPTIVE STATISTICS

AGE

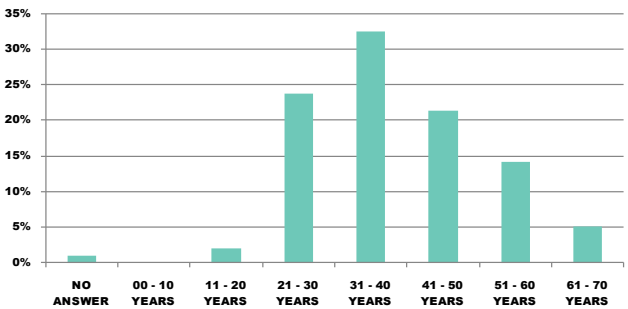


Figure 3.3.63: Distribution of the respondents by age groups.

The majority of the respondents at Bryggebro are between 31-40 years old (32%), followed closely by respondents aged 21-30 (24%) and aged 41-50 (21%). Older respondents ranged from 51-60 years old (14%) and 61-70 years old (5%). Younger respondents were aged between 11-20 (2%). There were no respondents aged between 0-10 years old. 2% of the respondents gave no answer.

EDUCATION LEVEL

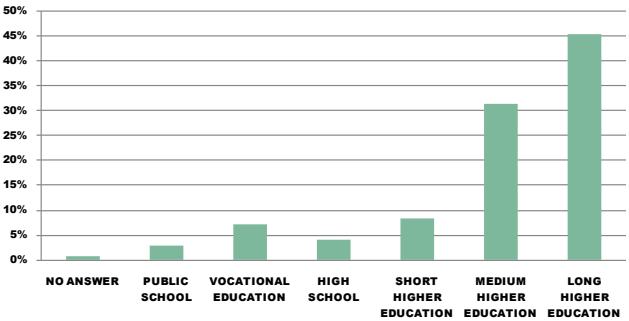


Figure 3.3.65: Distribution of the respondents by educational level.

A large majority of respondents answered that they have attended a high education, for either a long high education (46%) or medium high education (31%). 8% of the respondents answered that they had attended a higher education for a short amount of time, and another 7% of respondents answered they had a vocational education. 3% had receiving a public school education. 1% of the respondents gave no answer. Bryggebro cyclists therefore seems to be commuting to jobs that require a high level of education.

GENDER

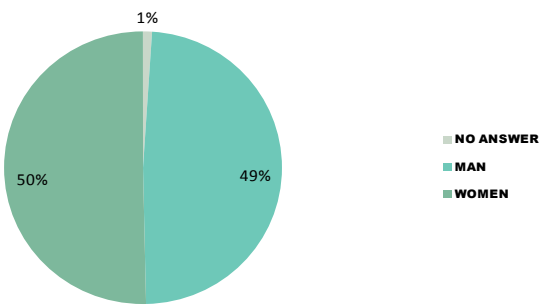


Figure 3.3.64: Distribution of the respondents by gender.

When asked about their gender, 50% of the respondents were women and 49% were men, with 1% giving no answer.

RIDING A BIKE AT BRYGGEBRO

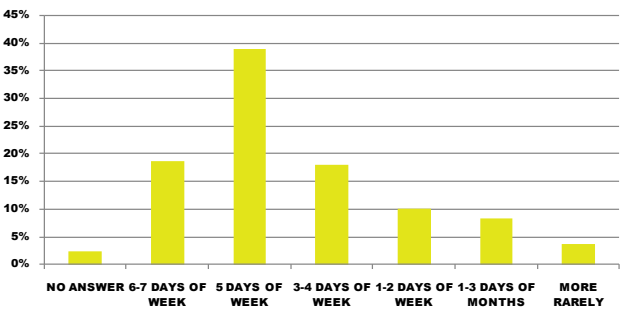


Figure 3.3.66: Distribution of the respondents by the frequency they ride a bicycle at Bryggebro.

When asked how often they ride a bike at the site, a majority of the respondents said that they use the bridge 5 days per week (39%). 19% used the site 6-7 days per week, 18% said 3-4 days per week, 10% said 1-2 days per week and 8% said 1-3 days per month. Finally, 4% answered that they ride a bike at the site less than once per month. 2% of the respondents did not answers.

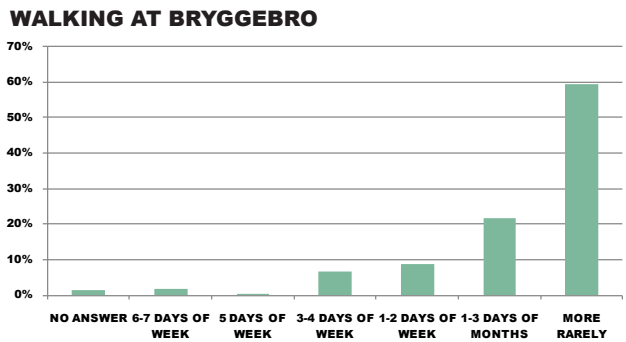


Figure 3.3.67: Distribution of the respondents by the frequency they walk at Bryggebro.

Respondents were asked how often they walk at Bryggebro without bike. A majority of respondents answered less than once per month (59%). 22% walked on Bryggebro 1-3 days a month, 9% answered 1-2 days a week, 7% answered 3-4 days a week. Finally, 2% stated that they walked across the bridge 6-7 days a week. This data highlights that most of Bryggebro's cyclists do not use the site for walking.

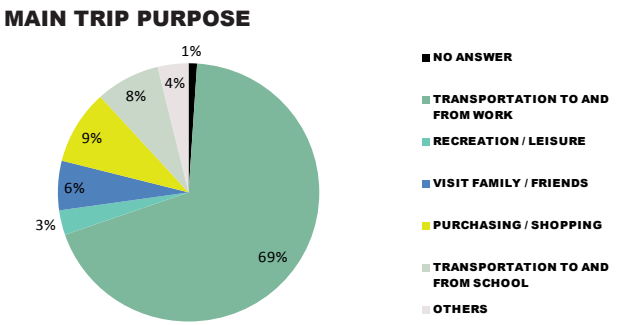


Figure 3.3.68: Distribution of the respondents by main trip purpose when riding a bike in Bryggebro.

When asked for what purpose the respondents use Bryggebro, 69% answered they use the infrastructure for commuting to and from work. 9% use Bryggebro for shopping, 8% use it to commute to school, 6% answered to see friends or family, 3% for recreation, 4% said other purposes. 1% of the respondents gave no answer. This figure again solidifies Bryggebro's purpose as infrastructure mostly used for commuting.

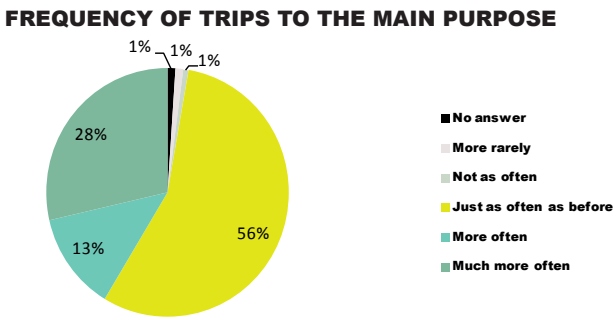


Figure 3.3.69: Distribution of the respondents by the frequency they ride a bike in Bryggebro for the main purpose mentioned in the Figure 3.3.68 after Bryggebro's opening.

Respondents were asked how often they use their bikes for the purpose in the previous question after Bryggebro's opening. 56 % of the respondents answered just as often as before. Notably 29% of respondents stated that they bike for that purpose much more often than before and 13% said more often than before. Only 2 % answered to travel less often or much less often 1 % of the respondents gave no answer. This data indicates that Bryggebro has had an impact on the amount of travelers, and has generated more bike trips, proving the latent demand of the bridge. .

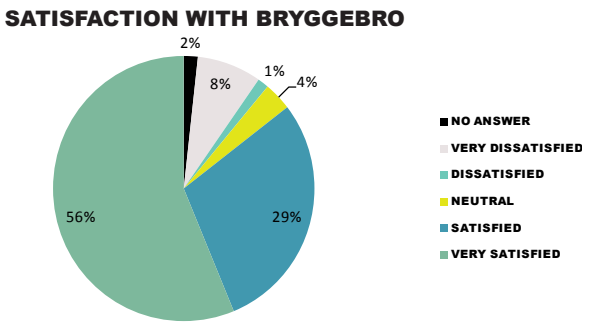


Figure 3.3.70: Distribution of the respondents by the level of satisfaction with Bryggebro's design.

When asked how satisfied they were with Bryggebro, 56% responded to be very satisfied with the infrastructure. 29% stated to be satisfied, and 4% were neutral. Of the rest, 1% said they were dissatisfied and 8% said they were very dissatisfied. 2% of the respondents gave no answer. This figure shows that most cyclists appreciate Bryggebro, but there are a few users who have major concerns with the design.

BRYGGEBRO`S DESIGN AND SAFETY

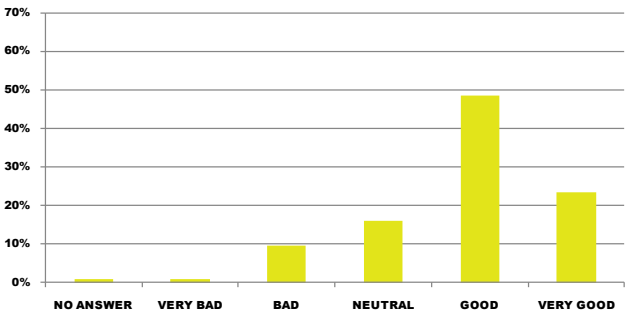


Figure 3.3.71: Distribution of the respondents according to their opinion about how the Bryggebro`s design fulfilled the bicyclist safety aspect.

Users were asked about the quality regarding the safety needs of the infrastructure. A majority of respondents answered that the design did a good job (49%) and 23% thought it did a very good job. 16% were neutral on the issue. 10% stated that it did a bad job and only 1% said the safety was very bad. 1% of the respondents gave no answer. These responses appear to say that while users are satisfied with the design of Bryggebro, the safety could only be better to a small degree.

BRYGGEBRO`S DESIGN AND AESTHETICS

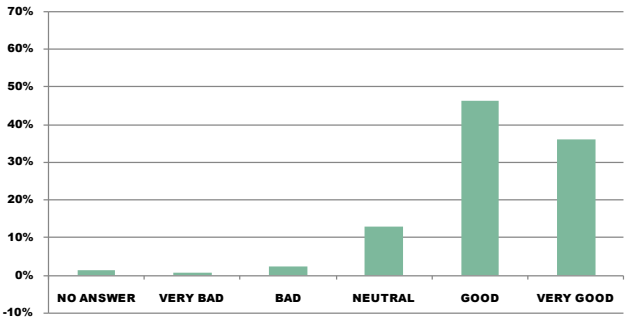


Figure 3.3.73: Distribution of the respondents according to their opinion about how the Bryggebro`s design fulfilled the aesthetics aspect.

When asked about the beauty of Bryggebro's design, the majority of respondents stated that it either did a very good (36%) or a good job (46%). 13% answered they were neutral on the design. Few of the respondents said it did poorly (2%), very poorly (1%). And 1% of the respondents gave no answer in regards to beauty. This figure indicates that users do notice the design of the bridge, and believe it adds to the cityscape.

BRYGGEBRO`S DESIGN AND FAST CONNECTIVITY

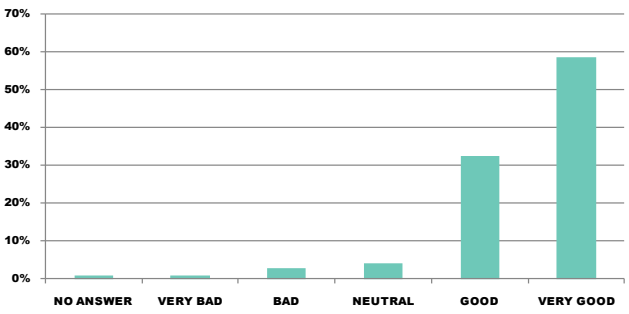


Figure 3.3.72: Distribution of the respondents according to their opinion about how the Bryggebro`s design fulfilled the fast connectivity.

Respondents were asked if they thought the design of Bryggebro was facilitating as a fast connections, and the majority responded that it did a very good (59%) or a good job (32%). 4% respondents were neutral on the issue. Very few stated that it did a bad job (3%) or a very bad (1%). 1% of the respondents gave no answer. From this figure, it is clear that Bryggebro does a good job of facilitating fast connections across the harbour.

ILLEGALLY PARKED BICYCLES

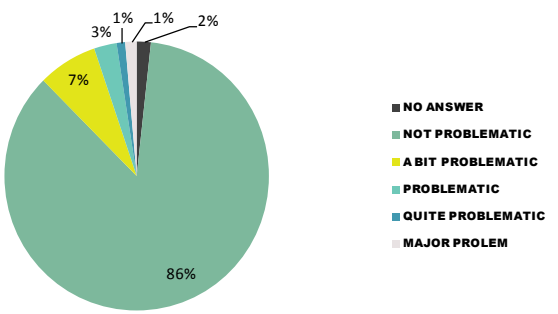


Figure 3.3.74: Distribution of the respondents according to their opinion about how problematic illegal parking of bicycles is at Bryggebro.

Users were asked if they thought that illegally parked bicycles were a problem at Bryggebro. A majority of respondents (86%) said that they were not a problem. On the other hand, 7% said it was a small problem, 3% said it was problematic, 1% said it was quite problematic, and 1% said it was very problematic. 2% of the respondents gave no answer. This figure shows that the design mitigate the problems with illegally parked bicycles.

CONFLICT BETWEEN DIFFERENT TRANSPORT MODES

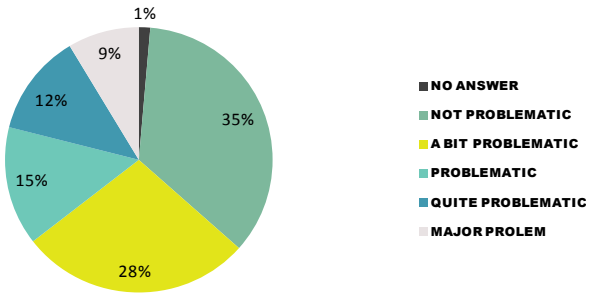


Figure 3.3.75: Distribution of the respondents according to their opinion about how problematic is the conflict between different transport modes at Bryggebro's accesses.

The responses covered a wide range. 35% of the respondents answered that it was not a problematic. However, 28% stated it was a bit problematic, 15% claimed it was problematic, 12% said it was quite a problem, and 9% responded that it was a major problem. 1% of the respondents gave no answer. This range shows that the shared sidewalks can be a confusing space, and the majority of respondents see it as somewhat problematic.

PAVEMENT PROBLEMS

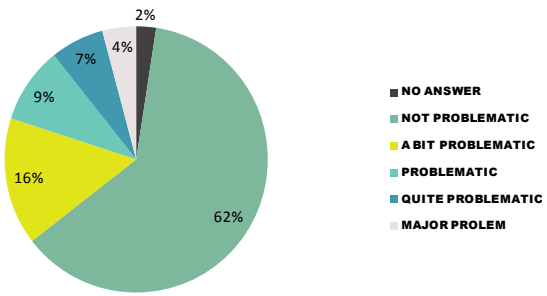


Figure 3.3.77: Distribution of the respondents according to their opinion about how problematic is the pavement at Bryggebro.

When asked whether they thought surface issues like potholes were a problem at Bryggebro, 62% of the responses said it was not a problem. 16% stated that it was a small problem, 9% claimed it was problematic, 7% said it was quite a problem, and 4% responded that it was a major problem. 2% of the respondents gave no answer. This figure shows that cyclists are satisfied with the pavement material from Bryggebro and the infrastructure has been well maintained, but conditions will have to be monitored as the structure ages.

OBSTACLES

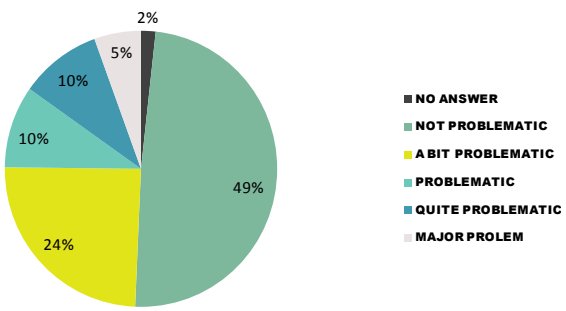


Figure 3.3.76: Distribution of the respondents according to their opinion about how problematic is the existence of obstacles against cyclists at Bryggebro.

Respondents were asked whether they thought obstacles at Bryggebro were an issue. The responses again covered a wide range, with the largest percentage of respondents (49%) saying it was not a problem. 24% stated that is was a small problem, 10% claimed it was problematic, 10% said it was quite a problem, and 5% responded that it was a major problem. 2% of the respondents gave no answer. This figure shows that 48% of users see obstacles as being an issue to some degree at Bryggebro.

CRACKS IN RAMPS AND INTERSECTIONS

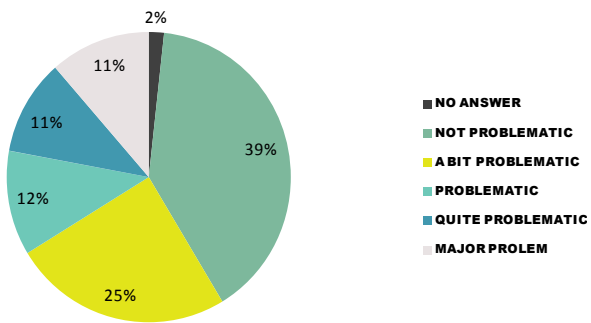


Figure 3.3.78: Distribution of the respondents according to their opinion about how problematic the existence of cracks in ramps and intersections is at Bryggebro.

Users were asked whether they thought cracks were a problem in ramps and intersections. 39% of the responses said it was not a problem at Bryggebro. 25% thought that it was a small problem, 12% claimed it was problematic, 11% said it was quite a problem, and another 11% responded that this was a major problem. 2% of the respondents gave no answer. These results show that cracks in ramps and intersections are a concern for the majority of users of Bryggebro, one that could be fixed with maintenance.

AWARENESS OF PEDESTRIANS FOR PEOPLE RIDING A BIKE

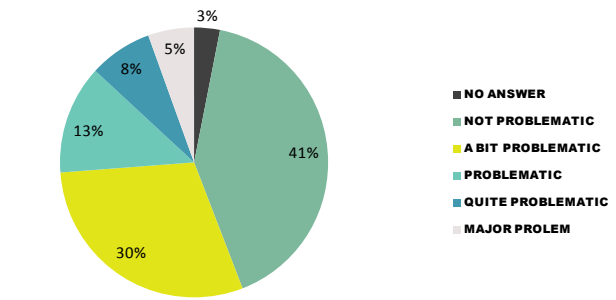


Figure 3.3.79: Distribution of the respondents according to their opinion about how problematic is the lack of awareness of pedestrians for people riding a bike at Bryggebro.

Respondents were asked whether they thought lack of awareness of pedestrians for cyclists was an issue. A majority of respondents thought it was not a problem (41%) or it was a small problem (30%). 13% stated it was problematic, 8% said it was quite a problem, and 5% responded that this was a major problem. 3% of the respondents gave no answer. This figure shows that for the majority of users lack of awareness by other users was somewhat of an issue.

SCENIC

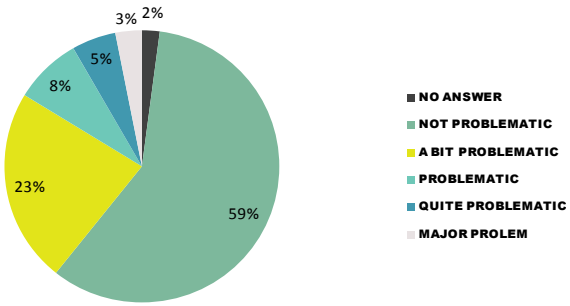


Figure 3.3.81: Distribution of the respondents according to their opinion about how problematic is the scenic at Bryggebro.

When asked whether they thought poor scenic landscaping was an issue at Bryggebro, 59% of the responses said it was not a problem. However, 23% said it was a small problem, 8% stated it was problematic, 5% said it was quite a problem, and 3% responded that this was a major problem. 2% of the respondents gave no answer. The figure shows a great coherence with previous question of poor signposting and interpretation.

SIGNPOSTING AND ITS INTERPRETATION

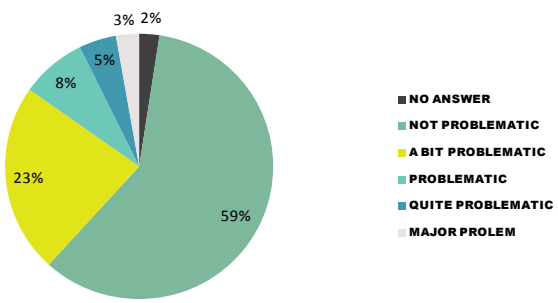


Figure 3.3.80: Distribution of the respondents according to their opinion about how problematic is signposting and its interpretation at Bryggebro.

When asked whether poor signage was an issue at Bryggebro, 59% of the responses said it was not a problem. On the other hand, 23% said it was a small problem, 8% stated it was problematic, 5% said it was quite a problem, and 3% responded that this was a major problem. 2% of the respondents gave no answer.

BIKING MORE OFTEN AFTER BRYGGEBRO INTERVENTION

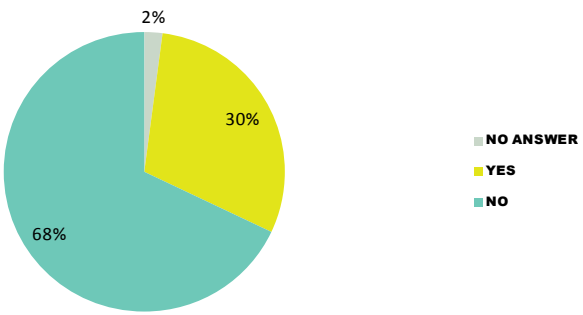


Figure 3.3.82: Distribution of the respondents based on starting to ride a bike more often, or not, after the opening of Bryggebro.

When asked whether they bike more often after Bryggebro opened, 68% said they have not biked more often. However, 30% of the respondents said that they were biking more often after the bridge opened. 2% of the respondents gave no answer. This figure shows that Bryggebro has increased ridership for a third of all users. This is evidence of a strong impact dedicated cycling facilities that enhance fast connectivity can have on trip generation.

QUALITIES INFLUENCING TO RIDE A BIKE

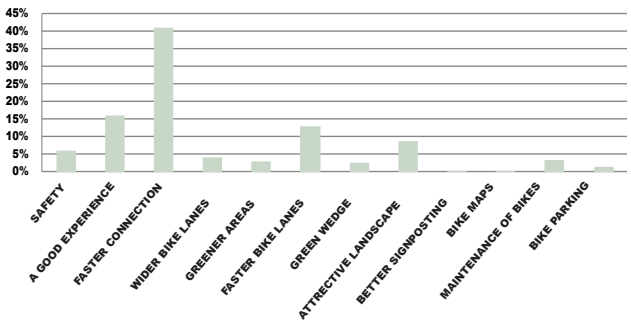


Figure 3.3.83: Among the respondents that said yes in the previous question (Figure 3.3.82), what qualities has influenced their choice to ride a bike more often after the opening of Bryggebro. The respondents could choice more than one option.

Respondents were asked what aspect of the intervention make them ride their bike more often, the largest portion of users stated that faster connections (41%) made the largest impact. 13% responded saying fast bicycle lanes made them ride more often, and 9% stated attractive landscaping made an impact for them. 34 stated they ride more often at Bryggebro because the pleasant experience and 4% replied wide bike lanes made the difference for them. From this data the most important factors that influenced the amount users ride was the faster trips that resulted from the infrastructure.

STREET DESIGN INFLUENCING TO RIDE A BIKE

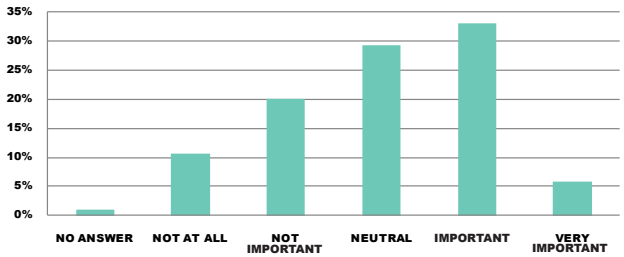


Figure 3.3.84: Distribution of respondents according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Users were asked, how important is street design in your decision to ride your bicycle. The largest portion of respondents answered saying that street design was important (33%), 29% were neutral on the issue, 20% said it was not important, and 11% said it was not important at all. Only 17% respondents stated that it was a very important factor for them. This figure shows that while streetscapes are not a critical factor in bicycle use, they are still important and noticed by users.

STREET DESIGN SOLUTIONS AT BRYGGEBRO

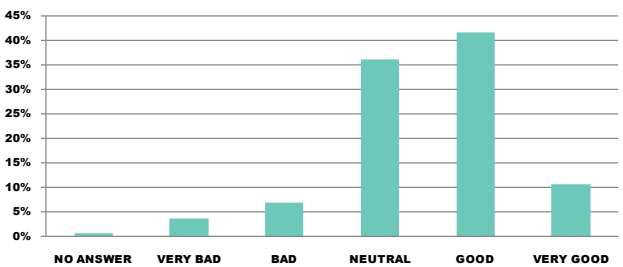


Figure 3.3.85: Distribution of respondents according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Bryggebro.

When asked for their opinion on the design solution applied to Bryggebro, most respondents replied that it was a good solution (42%) or that they were neutral on the issue (36%). 11% believed it was a very good design solution. On ther other hand, 7% thought it was poor and 4% responded very poor. 1% of the respondents gave no answer.

RELATIONS BETWEEN SOCIO-DEMOGRAPHIC VARIABLES AND WEB-SURVEY ANSWERS

The Chi2 test was applied to identify possible relations between the socio-demographics (independent variables) of the sample and their answers from the web survey (dependable variables). Considering the nature of the studied variables – the majority of them are nominal – the Chi2 test was selected to this analysis.

The Chi2 test is about finding out if there is a connection between the variables. It is about testing the nul hypothesis. H0 says that the variables are statistic independent and HA says the variables are statistic dependent. To the test we set a α-level at 0,05. In the case of the p-value is under that, we can't reject the nul hypothesis.

SOCIO-DEMOGRAPHICS AND RIDING A BIKE AT BRYGGEBRO

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
MALE	27	53	24	15	12	7	138
FEMALE	26	57	28	14	12	4	141
TOTAL	53	110	52	29	24	11	279

Table 3.3.2: Distribution of the respondents by gender according to the frequency they ride a bicycle at Bryggebro.

Out of the Table 3.3.2, the SPSS calculated the Chi2 to be 1,293 with a degree of freedom (df) 5 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
PUBLIC SCHOOL	3	1	1	1	1	1	8
VOCATIONAL EDUC.	6	8	3	2	1	0	20
HIGH SCHOOL	4	3	3	1	0	1	12
SHORT HIGHER EDUC.	4	11	4	1	0	3	23
MEDIUM HIGHER EDUC.	16	36	13	8	12	5	90
LONG HIGHER EDUC.	21	51	28	16	10	1	127
TOTAL	54	110	52	29	24	11	280

Table 3.3.3: Distribution of the respondents by educational level according to the frequency they ride a bicycle at Bryggebro.

Out of the Table 3.3.3, the SPSS calculated the Chi2 to be 28,344 with a degree of freedom (df) 5 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
01-20 YEARS	1	1	1	1	1	1	6
21-30 YEARS	14	21	19	5	3	2	64
31-40 YEARS	15	41	16	14	5	3	94
41-50 YEARS	11	27	8	5	8	2	61
51-60 YEARS	8	13	4	4	7	2	38
61-90 YEARS	4	6	4	0	0	1	15
TOTAL	53	109	52	29	24	11	278

Table 3.3.4: Distribution of the respondents by age groups according to the frequency they ride a bicycle at Bryggebro.

Out of the Table 3.3.4, the SPSS calculated the Chi2 to be 28,288 with a degree of freedom (df) 25 and the missing values are 12. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND WALKING AT BRYGGEBRO

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
MALE	2	1	8	12	24	9	139
FEMALE	3	0	11	14	37	78	143
TOTAL	2	1	19	26	61	170	282

Table 3.3.5: Distribution of the respondents by gender according to the frequency they walk at Bryggebro

Out of the Table 3.3.5, the SPSS calculated the Chi2 to be 5,695 with a degree of freedom (df) 5 and the missing values are 8. The P value is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS- /WEEK	5 DAYS- /WEEK	3-4 DAYS /WEEK	1-2 DAYS /WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
PUBLIC SCHOOL	0	0	2	2	2	2	8
VOCATIONAL EDUC.	1	0	1	1	7	10	20
HIGH SCHOOL	0	0	2	1	1	8	12
SHORT HIGHER EDUC.	0	0	2	3	5	13	23
MEDIUM HIGHER EDUC.	2	0	2	10	18	58	90
LONG HIGHER EDUC.	2	1	10	9	28	80	130
TOTAL	5	1	19	26	61	171	283

Table 3.3.6: Distribution of the respondents by educational level according to the frequency they walk at Bryggebro

Out of the Table 3.3.6, the SPSS calculated the Chi2 to be 21,379 with a degree of freedom (df) 25 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	6-7 DAYS/ WEEK	5 DAYS/ WEEK	3-4 DAYS/ WEEK	1-2 DAYS/ WEEK	1-3 DAYS/ MONTHS	MORE RARELY	TOTAL
01-20 YEARS	0	0	1	1	1	3	6
21-30 YEARS	2	0	5	4	16	40	67
31-40 YEARS	2	0	5	11	24	51	93
41-50 YEARS	1	1	3	3	11	43	62
51-60 YEARS	0	0	3	5	2	29	39
61-90 YEARS	0	0	2	2	5	5	14
TOTAL	5	1	19	26	59	171	281

Table 3.3.7: Distribution of the respondents by age groups according to the frequency they walk at Bryggebro

Out of the Table 3.3.7, the SPSS calculated the Chi2 to be 23,805 with a degree of freedom (df) 25 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND MAIN TRIP PURPOSE

	TRANS. TO AND FROM WORK	RECREATION / LEISURE	VISIT FAMILY / FRIENDS	PURCHASING / SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
MALE	104	4	4	13	7	7	139
FEMALE	92	5	14	13	16	4	144
TOTAL	196	9	18	26	23	11	283

Table 3.3.8: Distribution of the respondents by gender according to the main trip purpose when riding a bike in Bryggebro.

Out of the Table 3.3.8, the SPSS calculated the Chi2 to be 10,656 with a degree of freedom (df) 5 and the missing values are 7. P is between 0,100 and 0,050. Therefore, the variables are independent.

	TRANS. TO AND FROM WORK	RECREA-TION/ LEISURE	VISIT FAMILY/ FRIENDS	PURCHA-SING/ SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
PUBLIC SCHOOL	4	1	0	2	0	1	8
VOCATIONAL EDUC.	17	2	0	0	0	1	20
HIGH SCHOOL	6	1	0	1	4	0	12
SHORT HIGHER EDUC.	19	0	1	3	0	0	23
MEDIUM HIGHER EDUC.	58	4	6	13	4	5	90
LONG HIGHER EDUC.	92	1	11	8	15	4	131
TOTAL	196	9	18	27	23	11	284

Table 3.3.9: Distribution of the respondents by educational level according to the main trip purpose when riding a bike in Bryggebro.

Out of the Table 3.3.9, the SPSS calculated the Chi2 to be 10,656 with a degree of freedom (df) 5 and the missing values are 7. P is between 0,100 and 0,050. Therefore, the variables are independent.

	TRANS. TO AND FROM WORK	RECREA-TION/ LEISURE	VISIT FAMILY/ FRIENDS	PURCHA-SING/ SHOPPING	TRANS. TO AND FROM SCHOOL	OTHERS	TOTAL
01-20 YEARS	0	1	0	1	3	1	6
21-30 YEARS	39	1	8	3	15	0	66
31-40 YEARS	70	2	4	12	4	2	94
41-50 YEARS	53	1	3	2	0	3	62
51-60 YEARS	27	2	2	5	1	2	39
61-90 YEARS	5	2	1	4	0	3	15
TOTAL	194	9	18	27	23	11	282

Table 3.3.10: Distribution of the respondents by age groups according to the main trip purpose when riding a bike in Bryggebro

Out of the Table 3.3.10, the SPSS calculated the Chi2 to be 91,975 with a degree of freedom (df) 20 and the missing values are 8. P is less than 0,001. Therefore, the variables are very dependent.

SOCIO-DEMOGRAPHICS AND FREQUENCY OF TRIPS TO THE MAIN PURPOSE

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
MALE	2	1	85	19	32	139
FEMALE	1	1	75	17	50	144
TOTAL	3	2	160	36	82	283

Table 3.3.11: Distribution of the respondents by gender according to the frequency they ride a bike in Bryggebro for the main purpose mentioned in the Table 3.3.68, after the intervention in Bryggebro.

Out of the Table 3.3.11, the SPSS calculated the Chi2 to be 4,934 with a degree of freedom (df) 4 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
PUBLIC SCHOOL	1	0	4	0	3	8
VOCATIONAL EDUC.	0	0	9	1	9	19
HIGH SCHOOL	0	0	5	2	5	12
SHORT HIGHER EDUC.	1	0	18	1	3	23
MEDIUM HIGHER EDUC.	0	1	48	13	29	91
LONG HIGHER EDUC.	1	1	76	19	34	131
TOTAL	3	2	160	36	83	284

Table 3.3.12: Distribution of the respondents by educational level according to the frequency they ride a bike in Bryggebro for the main purpose mentioned in the Table 3.3.68, after the intervention in Bryggebro.

Out of the Table 3.3.12, the SPSS calculated the Chi2 to be 26,838 with a degree of freedom (df) 20 and the missing values are 6. P is between 0,250 and 0,100. Therefore, the variables are independent.

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
01-20 YEARS	1	0	4	0	1	6
21-30 YEARS	0	1	39	12	15	67
31-40 YEARS	0	1	53	8	31	93
41-50 YEARS	1	0	35	5	21	62
51-60 YEARS	1	0	19	8	11	39
61-90 YEARS	0	0	9	3	3	15
TOTAL	3	2	159	36	82	282

Table 3.3.13: Distribution of the respondents by age groups according to the frequency they ride a bike in Bryggebro for the main purpose mentioned in the Table 3.3.68, after the intervention in Bryggebro.

Out of the Table 3.3.13, the SPSS calculated the Chi2 to be 28,606 with a degree of freedom (df) 20 and the missing values are 8. is between 0,100 and 0,050, but very close to 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND SATISFACTION WITH BRYGGEBRO

	MORE RARELY	NOT AS OFTEN	JUST AS OFTEN AS BEFORE	MORE OFTEN	MUCH MORE OFTEN	TOTAL
MALE	2	1	85	19	32	139
FEMALE	1	1	75	17	50	144
TOTAL	3	2	160	36	82	283

Table 3.3.14: Distribution of the respondents by gender according to the level of satisfaction with the design of Bryggebro.

Out of the Table 3.3.14, the SPSS calculated the Chi2 to be 3,259 with a degree of freedom (df) 4 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	VERY DIS-SATISFIED	DIS-SATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	0	0	0	8	8
VOCATIONAL EDUC.	2	1	0	5	11	19
HIGH SCHOOL	3	0	0	2	7	12
SHORT HIGHER EDUC.	0	0	2	8	12	22
MEDIUM HIGHER EDUC.	8	1	3	30	48	90
LONG HIGHER EDUC.	9	2	5	38	77	131
TOTAL	22	4	10	83	163	282

Table 3.3.15: Distribution of the respondents by educational level according to the level of satisfaction with the design of Bryggebro.

Out of the Table 3.3.15, the SPSS calculated the Chi2 to be 20,081 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	VERY DISSATISFIED	DISSATISFIED	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	0	0	0	6	6
21-30 YEARS	5	1	3	25	32	66
31-40 YEARS	10	1	1	28	54	94
41-50 YEARS	3	2	3	17	36	61
51-60 YEARS	2	0	3	10	24	39
61-90 YEARS	2	0	0	3	9	14
TOTAL	22	4	10	83	161	280

Table 3.3.16: Distribution of the respondents by age groups according to the level of satisfaction with the design of Bryggebro.

Out of the Table 3.3.16, the SPSS calculated the Chi2 to be 17,233 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE IMPACT OF BRYGGEBRO`S DESIGN ON SAFETY

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	3	14	18	69	36	140
FEMALE	0	14	29	69	31	143
TOTAL	3	28	47	138	67	283

Table 3.3.17: Distribution of the respondents by gender according to their opinion about how the Bryggebro`s design fulfilled the cyclist safety aspect.

Out of the Table 3.3.17, the SPSS calculated the Chi2 to be 5,916 with a degree of freedom (df) 4 and the missing values are 7. P is between 0,250 and 0,100. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	0	1	3	4	8
VOCATIONAL EDUC.	0	3	5	7	4	19
HIGH SCHOOL	0	1	2	5	4	12
SHORT HIGHER EDUC.	1	2	5	11	4	23
MEDIUM HIGHER EDUC.	1	12	17	42	19	91
LONG HIGHER EDUC.	1	10	17	71	32	131
TOTAL	3	28	47	139	67	284

Table 3.3.18: Distribution of the respondents by educational level according to their opinion about how the Bryggebro`s design fulfilled the cyclist safety aspect.

Out of the Table 3.3.18, the SPSS calculated the Chi2 to be 14,293 with a degree of freedom (df) 5 and the missing values are 6. P is bigger than 0,100. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	0	0	4	2	6
21-30 YEARS	1	8	10	30	18	67
31-40 YEARS	1	10	15	48	20	94
41-50 YEARS	1	4	13	29	14	61
51-60 YEARS	0	3	7	22	7	39
61-90 YEARS	0	3	2	6	4	15
TOTAL	3	28	47	139	65	282

Table 3.3.19: Distribution of the respondents by age group according to their opinion about how the Bryggebro`s design fulfilled the cyclist safety aspect.

Out of the Table 3.3.19, the SPSS calculated the Chi2 to be 9,124 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE IMPACT OF BRYGGEBRO`S DESIGN ON FAST CONNECTIVITY

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	0	4	4	45	87	140
FEMALE	3	4	8	48	80	143
TOTAL	3	8	12	93	167	283

Table 3.3.20: Distribution of the respondents by gender according to their opinion about how the Bryggebro`s design fulfilled the fast connectivity.

Out of the Table 3.3.20, the SPSS calculated the Chi2 to be 4,692 with a degree of freedom (df) 4 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	0	0	1	7	8
VOCATIONAL EDUC.	2	0	0	4	13	19
HIGH SCHOOL	0	1	1	3	7	12
SHORT HIGHER EDUC.	0	0	1	10	12	23
MEDIUM HIGHER EDUC.	0	2	5	28	56	91
LONG HIGHER EDUC.	1	5	5	48	72	131
TOTAL	3	8	12	94	167	284

Table 3.3.21: Distribution of the respondents by educational level according to their opinion about how the Bryggebro`s design fulfilled the fast connectivity.

Out of the Table 3.3.21, the SPSS calculated the Chi2 to be 28,493 with a degree of freedom (df) 20 and the missing values are 6. P is between 0,100 and 0,050, but very close to 0,100. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	0	0	2	4	6
21-30 YEARS	1	3	5	21	37	67
31-40 YEARS	2	2	4	33	53	94
41-50 YEARS	0	1	2	25	33	61
51-60 YEARS	0	2	1	10	26	39
61-90 YEARS	0	0	0	2	13	15
TOTAL	3	8	12	93	166	282

Table 3.3.22: Distribution of the respondents by age groups according to their opinion about how the Bryggebro`s design fulfilled the fast connectivity.

Out of the Table 3.3.22, the SPSS calculated the Chi2 to be 14,424 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT BRYGGEBRO`S AESTHETICS

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	1	3	22	63	50	139
FEMALE	1	3	15	70	54	143
TOTAL	2	6	37	133	104	282

Table 3.3.23: Distribution of the respondents by gender according to their opinion about how the Bryggebro`s design fulfilled the aesthetics aspect.

Out of the Table3.3.23, the SPSS calculated the Chi2 to be 1,790 with a degree of freedom (df) 4 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	0	3	3	2	8
VOCATIONAL EDUC.	0	0	3	9	7	19
HIGH SCHOOL	1	0	2	4	5	12
SHORT HIGHER EDUC.	0	1	1	14	7	23
MEDIUM HIGHER EDUC.	0	3	13	44	30	90
LONG HIGHER EDUC.	1	2	16	59	53	131
TOTAL	2	6	38	133	104	283

Table 3.3.24: Distribution of the respondents by educational level according to their opinion about how the Bryggebro`s design fulfilled the aesthetics aspect.

Out of the Table 3.3.24, the SPSS calculated the Chi2 to be 21,483 with a degree of freedom (df) 20 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	0	2	2	2	6
21-30 YEARS	2	0	6	31	28	67
31-40 YEARS	0	1	20	45	28	94
41-50 YEARS	0	2	5	34	20	61
51-60 YEARS	0	3	4	14	18	39
61-90 YEARS	0	0	1	7	6	14
TOTAL	2	6	38	133	102	281

Table 3.3.25: Distribution of the respondents by age groups according to their opinion about how the Bryggebro`s design fulfilled the aesthetics aspect.

Out of the Table 3.3.25, the SPSS calculated the Chi2 to be 29,093 with a degree of freedom (df) 20 and the missing values are 9. P is between 0,100 and 0,050. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT ILLEGALLY PARKED BICYCLES

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	123	12	2	1	1	139
FEMALE	124	8	6	1	3	142
TOTAL	247	20	8	2	4	281

Table 3.3.26: Distribution of the respondents by gender according to their opinion about how problematic illegal parking of bicycles is at Bryggebro.

Out of the Table 3.3.26, the SPSS calculated the Chi2 to be 3,772 with a degree of freedom (df) 4 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	7	0	1	0	0	8
VOCATIONAL EDUC.	15	3	1	0	0	19
HIGH SCHOOL	10	2	0	0	0	12
SHORT HIGHER EDUC.	21	1	0	0	1	23
MEDIUM HIGHER EDUC.	77	9	4	1	0	91
LONG HIGHER EDUC.	177	5	2	2	3	129
TOTAL	247	20	8	3	4	282

Table 3.3.27: Distribution of the respondents by educational level according to their opinion about how problematic illegal parking of bicycles is at Bryggebro.

Out of the Table 3.3.27, the SPSS calculated the Chi2 to be 18,216 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	5	1	0	0	0	6
21-30 YEARS	57	6	2	0	2	67
31-40 YEARS	87	2	2	1	1	93
41-50 YEARS	55	5	1	1	0	62
51-60 YEARS	29	6	2	0	1	38
61-90 YEARS	12	0	1	1	0	14
TOTAL	245	20	8	3	4	280

Table 3.3.28: Distribution of the respondents by age groups according to their opinion about how problematic illegal parking of bicycles is at Bryggebro.

Out of the Table 3.3.28, the SPSS calculated the Chi2 to be 21,664 with a degree of freedom (df) 5 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT CONFLICT BETWEEN DIFFERENT TRANSPORT MODES

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	56	37	20	12	13	138
FEMALE	44	44	21	23	12	144
TOTAL	100	81	41	35	25	282

Table 3.3.29: Distribution of the respondents by gender according to their opinion about how problematic is the conflict between different transport modes at Bryggebro.

Out of the Table 3.3.29, the SPSS calculated the Chi2 to be 5,441 with a degree of freedom (df) 4 and the missing values are 8. P is between 0,250 and 0,100, but very close to 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	2	6	0	0	0	8
VOCATIONAL EDUC.	7	4	5	1	1	18
HIGH SCHOOL	4	2	5	1	0	12
SHORT HIGHER EDUC.	8	6	1	6	2	23
MEDIUM HIGHER EDUC.	37	24	13	6	11	91
LONG HIGHER EDUC.	43	39	17	21	11	131
TOTAL	101	81	41	35	25	283

Table 3.3.30: Distribution of the respondents by educational level according to their opinion about how problematic is the conflict between different transport modes at Bryggebro.

Out of the Table 3.3.30, the SPSS calculated the Chi2 to be 32,020 with a degree of freedom (df) 20 and the missing values are 7. P is between 0,050 and 0,025. Therefore, the variables are dependent

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	3	2	1	0	0	6
21-30 YEARS	20	23	9	8	7	67
31-40 YEARS	38	27	8	14	6	93
41-50 YEARS	23	17	14	3	5	62
51-60 YEARS	9	11	5	10	4	39
61-90 YEARS	7	1	3	0	3	14
TOTAL	100	81	40	35	25	281

Table 3.3.31: Distribution of the respondents by age groups according to their opinion about how problematic is the conflict between different transport modes at Bryggebro.

Out of the Table 3.3.31, the SPSS calculated the Chi2 to be 23,805 with a degree of freedom (df) 20 and the missing values are 9. P is between 0,250 and 0,100, but very close to 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT OBSTACLES AGAINST CYCLISTS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	74	28	16	14	7	139
FEMALE	66	42	11	14	9	142
TOTAL	140	70	27	28	16	281

Table 3.3.32: Distribution of the respondents by gender according to their opinion about how problematic is the existence of obstacles against the cyclists at Bryggebro.

Out of the Table 3.3.32, the SPSS calculated the Chi2 to be 4,402 with a degree of freedom (df) 4 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	4	4	0	0	0	8
VOCATIONAL EDUC.	8	5	4	0	2	19
HIGH SCHOOL	7	4	1	0	0	12
SHORT HIGHER EDUC.	12	3	2	2	3	22
MEDIUM HIGHER EDUC.	43	27	6	11	3	90
LONG HIGHER EDUC.	67	27	14	15	8	131
TOTAL	141	70	27	28	16	282

Table 3.3.33: Distribution of the respondents by educational level according to their opinion about how problematic is the existence of obstacles against the cyclists at Bryggebro.

Out of the Table 3.3.33, the SPSS calculated the Chi2 to be 20,378 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	3	3	0	0	0	6
21-30 YEARS	25	17	10	10	5	67
31-40 YEARS	52	17	10	10	4	93
41-50 YEARS	35	16	4	3	3	61
51-60 YEARS	19	13	2	3	2	39
61-90 YEARS	5	4	1	2	2	14
TOTAL	139	70	27	28	16	280

Table 3.3.34: Distribution of the respondents by age groups according to their opinion about how problematic is the existence of obstacles against the cyclists at Bryggebro.

Out of the Table 3.3.34, the SPSS calculated the Chi2 to be 19,842 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT THE PAVEMENT

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	88	21	13	11	6	139
FEMALE	89	23	14	8	6	140
TOTAL	177	44	27	19	12	279

Table 3.3.35: Distribution of the respondents by gender according to their opinion about how problematic is the pavement at Bryggebro.

Out of the Table 3.3.35, the SPSS calculated the Chi2 to be 0,604 with a degree of freedom (df) 5 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	5	2	1	0	0	8
VOCATIONAL EDUC.	14	2	3	0	0	19
HIGH SCHOOL	9	1	1	1	0	12
SHORT HIGHER EDUC.	12	4	3	0	3	22
MEDIUM HIGHER EDUC.	56	14	8	7	3	88
LONG HIGHER EDUC.	82	21	11	11	6	131
TOTAL	178	44	27	19	12	280

Table 3.3.36: Distribution of the respondents by educational level according to their opinion about how problematic is the pavement at Bryggebro.

Out of the Table 3.3.36, the SPSS calculated the Chi2 to be 13,957 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	3	2	1	0	0	6
21-30 YEARS	38	12	6	7	3	66
31-40 YEARS	68	8	9	4	3	92
41-50 YEARS	39	11	7	3	2	62
51-60 YEARS	21	9	2	3	3	38
61-90 YEARS	7	2	2	2	1	14
TOTAL	176	44	27	19	12	278

Table 3.3.37 Distribution of the respondents by age groups according to their opinion about how problematic is the pavement at Bryggebro.

Out of the Table 3.3.37, the SPSS calculated the Chi2 to be 16,722 with a degree of freedom (df) 5 and the missing values are 12. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT CRACKS IN RAMPS AND INTERSECTIONS

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	56	37	16	14	14	137
FEMALE	57	33	18	17	19	144
TOTAL	113	70	34	31	33	281

Table 3.3.38: Distribution of the respondents by gender according to their opinion about how problematic is the existence of cracks in ramps and intersectios is at Bryggebro.

Out of the Table 3.3.38, the SPSS calculated the Chi2 to be 1,229 with a degree of freedom (df) 4 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	4	3	1	0	0	8
VOCATIONAL EDUC.	4	7	5	3	0	19
HIGH SCHOOL	6	4	1	0	1	12
SHORT HIGHER EDUC.	8	3	4	4	4	23
MEDIUM HIGHER EDUC.	42	17	12	9	11	91
LONG HIGHER EDUC.	49	37	11	15	17	129
TOTAL	113	71	34	31	33	282

Table 3.3.39: Distribution of the respondents by educational level according to their opinion about how problematic is the existence of cracks in ramps and intersections is at Bryggebro.

Out of the Table 3.3.39, the SPSS calculated the Chi2 to be 21,754 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	2	4	0	0	0	6
21-30 YEARS	20	20	5	10	10	65
31-40 YEARS	48	14	15	8	9	94
41-50 YEARS	25	17	7	8	5	62
51-60 YEARS	13	12	6	2	5	38
61-90 YEARS	4	3	1	3	4	15
TOTAL	112	70	34	31	33	280

Table 3.3.40: Distribution of the respondents by age groups according to their opinion about how problematic is the existence of cracks in ramps and intersections is at Bryggebro.

Out of the Table 3.3.40, the SPSS calculated the Chi2 to be 29,037 with a degree of freedom (df) 20 and the missing values are 10. P is between 0,100 and 0,050. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT AWARENESS OF PEDESTRIANS FOR PEOPLE RIDING A BIKE

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	56	37	16	14	14	137
FEMALE	57	33	18	17	19	144
TOTAL	113	70	34	31	33	281

Table 3.3.41: Distribution of the respondents by gender according to their opinion about how problematic is the lack of awareness of pedestrians for people riding a bike at Bryggebro.

Out of the Table 3.3.41, the SPSS calculated the Chi2 to be 11,754 with a degree of freedom (df) 4 and the missing values are 13. P is between 0,025 and 0,010. Therefore, the variables are dependent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	5	2	0	0	1	8
VOCATIONAL EDUC.	5	7	1	4	1	18
HIGH SCHOOL	5	4	2	1	0	12
SHORT HIGHER EDUC.	8	9	2	2	2	23
MEDIUM HIGHER EDUC.	39	25	14	6	6	90
LONG HIGHER EDUC.	56	38	18	9	6	127
TOTAL	118	85	37	22	16	278

Table 3.3.42: Distribution of the respondents by educational level according to their opinion about how problematic is the lack of awareness of pedestrians for people riding a bike at Bryggebro.

Out of the Table 3.3.42, the SPSS calculated the Chi2 to be 13,796 with a degree of freedom (df) 20 and the missing values are 12. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	4	0	1	0	0	5
21-30 YEARS	21	26	8	7	4	66
31-40 YEARS	45	31	11	3	3	93
41-50 YEARS	30	13	8	6	4	61
51-60 YEARS	13	10	6	5	3	37
61-90 YEARS	5	4	2	1	2	14
TOTAL	118	84	36	22	16	276

Table 3.3.43: Distribution of the respondents by age groups according to their opinion about how problematic is the lack of awareness of pedestrians for people riding a bike at Bryggebro.

Out of the Table 3.3.43, the SPSS calculated the Chi2 to be 20,198 with a degree of freedom (df) 20 and the missing values are 14. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT SIGNPOSTING AND ITS INTERPRETATION

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	89	30	8	7	3	137
FEMALE	80	36	15	6	5	142
TOTAL	169	66	23	13	8	279

Table 3.3.44: Distribution of the respondents by gender according to their opinion about how problematic is signposting and its interpretation at Bryggebro.

Out of the Table 3.3.44, the SPSS calculated the Chi2 to be 3,644 with a degree of freedom (df) 4 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	4	3	0	1	0	8
VOCATIONAL EDUC.	9	8	0	1	1	19
HIGH SCHOOL	6	4	1	0	0	11
SHORT HIGHER EDUC.	11	6	4	1	1	23
MEDIUM HIGHER EDUC.	57	18	10	3	2	90
LONG HIGHER EDUC.	83	27	8	7	4	129
TOTAL	170	66	23	13	8	280

Table 3.3.45: Distribution of the respondents by educational level according to their opinion about how problematic is signposting and its interpretation at Bryggebro.

Out of the Table 3.3.45, the SPSS calculated the Chi2 to be 16,409 with a degree of freedom (df) 20 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	3	3	0	0	0	6
21-30 YEARS	40	9	11	6	1	67
31-40 YEARS	54	24	6	5	3	92
41-50 YEARS	38	17	4	0	2	61
51-60 YEARS	23	11	1	2	1	38
61-90 YEARS	10	2	1	0	1	14
TOTAL	168	66	23	13	8	278

Table 3.3.46: Distribution of the respondents by age groups according to their opinion about how problematic is signposting and its interpretation at Bryggebro.

Out of the Table 3.3.46, the SPSS calculated the Chi2 to be 22,884 with a degree of freedom (df) 5 and the missing values are 12. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT SCENIC

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
MALE	75	39	16	5	4	138
FEMALE	93	28	7	9	5	142
TOTAL	168	66	23	14	9	280

Table 3.3.47: Distribution of the respondents by gender according to their opinion about how problematic is the scenic at Bryggebro.

Out of the Table 3.3.47, the SPSS calculated the Chi2 to be 8,164 with a degree of freedom (df) 4 and the missing values are 10. P is between 0,100 and 0,050. Therefore, the variables are independent.

	NOT PROBLE-MATIC	A BIT PROBLE-MATIC	PROBLE-MATIC	QUITE PROBLE-MATIC	MAJOR PROBLEM	TOTAL
PUBLIC SCHOOL	6	1	0	1	0	8
VOCATIONAL EDUC.	13	4	1	0	1	19
HIGH SCHOOL	9	1	1	1	0	12
SHORT HIGHER EDUC.	14	3	4	1	0	22
MEDIUM HIGHER EDUC.	47	25	8	5	4	89
LONG HIGHER EDUC.	79	32	9	7	4	131
TOTAL	168	66	23	15	9	281

Table 3.3.48: Distribution of the respondents by educational level gender according to their opinion about how problematic is the scenic at Bryggebro.

Out of the Table 3.3.48, the SPSS calculated the Chi2 to be 13,169 with a degree of freedom (df) 20 and the missing values are 9. P is bigger than 0,250. Therefore, the variables are independent.

	NOT PROBLEMATIC	A BIT PROBLEMATIC	PROBLEMATIC	QUITE PROBLEMATIC	MAJOR PROBLEM	TOTAL
01-20 YEARS	3	1	1	1	0	6
21-30 YEARS	40	19	1	4	2	66
31-40 YEARS	53	24	8	4	3	92
41-50 YEARS	41	12	7	1	1	62
51-60 YEARS	23	8	4	3	1	39
61-90 YEARS	6	2	2	2	2	14
TOTAL	166	66	23	15	9	279

Table 3.3.49: Distribution of the respondents by age groups according to their opinion about how problematic is the scenic at Bryggebro.

Out of the Table 3.3.49, the SPSS calculated the Chi2 to be 21,015 with a degree of freedom (df) 20 and the missing values are 11. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND BIKING MORE OFTEN AFTER BRYGGEBRO`S OPENING

	YES	NO	TOTAL
MALE	41	97	138
FEMALE	45	97	142
TOTAL	86	194	280

Table 3.3.50: Distribution of the respondents by gender based on starting to ride a bike more often, or not, after the opening of Bryggebro.

Out of the Table 3.3.50, the SPSS calculated the Chi2 to be 0,129 with a degree of freedom (df) 4 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

	YES	NO	TOTAL
PUBLIC SCHOOL	5	3	8
VOCATIONAL EDUC.	10	10	20
HIGH SCHOOL	4	7	11
SHORT HIGHER EDUC.	3	20	23
MEDIUM HIGHER EDUC.	24	64	88
LONG HIGHER EDUC.	40	91	131
TOTAL	86	195	281

Table 3.3.51: Distribution of the respondents by educational level based on starting to ride a bike more often, or not, after the opening of Bryggebro.

Out of the Table 3.3.51, the SPSS calculated the Chi2 to be 11,346 with a degree of freedom (df) 5 and the missing values are 9. P is between 0,050 and 0,025, but close to 0,050. Therefore, the variables are dependent.

	YES	NO	TOTAL
01-20 YEARS	4	2	6
21-30 YEARS	15	52	67
31-40 YEARS	26	66	92
41-50 YEARS	23	39	62
51-60 YEARS	12	27	39
61-90 YEARS	5	8	13
TOTAL	85	194	279

Table 3.3.52: Distribution of the respondents by age groups based on starting to ride a bike more often, or not, after the opening of Bryggebro.

Out of the Table 3.3.52, the SPSS calculated the Chi2 to be 7,667 with a degree of freedom (df) 5 and the missing values are 11. P is between 0,250 and 0,100. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT STREET DESIGN AS INFLUENTIAL FACTOR TO RIDE A BIKE

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
MAN	18	25	44	47	6	140
FEMALE	13	32	39	48	11	143
TOTAL	31	57	83	95	17	283

Table 3.3.53: Distribution of respondents by gender according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.3.53, the SPSS calculated the Chi2 to be 3,417 with a degree of freedom (df) 4 and the missing values are 7. P is bigger than 0,250. Therefore, the variables are independent.

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
PUBLIC SCHOOL	0	0	4	3	0	7
VOCATIONAL EDUC.	0	3	9	8	0	20
HIGH SCHOOL	3	2	4	2	1	12
SHORT HIGHER EDUC.	4	6	5	6	2	23
MEDIUM HIGHER EDUC.	12	24	23	27	5	91
LONG HIGHER EDUC.	12	22	38	50	9	131
TOTAL	31	57	83	96	17	284

Table 3.3.54: Distribution of respondents by educational level according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.3.54, the SPSS calculated the Chi2 to be 21,286 with a degree of freedom (df) 20 and the missing values are 6. P is bigger than 0,250. Therefore, the variables are independent.

	NOT AT ALL IMPORTANT	NOT IMPORTANT	NEUTRAL	IMPORTANT	VERY IMPORTANT	TOTAL
01-20 YEARS	0	0	3	2	1	6
21-30 YEARS	12	14	18	19	4	67
31-40 YEARS	12	19	20	39	4	94
41-50 YEARS	2	16	23	16	5	62
51-60 YEARS	3	5	14	15	2	39
61-90 YEARS	2	3	4	4	1	14
TOTAL	31	57	82	95	17	282

Table 3.3.55: Distribution of respondents by age groups according to their opinion about the importance of street design (lightning, pavement material, greenery, etc) in the decision to ride a bike.

Out of the Table 3.3.55, the SPSS calculated the Chi2 to be 21,908 with a degree of freedom (df) 20 and the missing values are 8. P is bigger than 0,250. Therefore, the variables are independent.

SOCIO-DEMOGRAPHICS AND OPINION ABOUT BRYGGEBRO`S DESIGN SOLUTION

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
MALE	7	10	56	53	14	140
FEMALE	3	10	49	68	17	144
TOTAL	10	20	102	121	31	284

Table 3.3.56: Distribution of respondents by gender according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Bryggebro.

Out of the Table 3.3.56, the SPSS calculated the Chi2 to be 4,675 with a degree of freedom (df) 4 and the missing values are 6. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
PUBLIC SCHOOL	0	1	2	3	2	8
VOCATIONAL EDUC.	0	1	10	6	3	20
HIGH SCHOOL	0	0	6	5	1	12
SHORT HIGHER EDUC.	2	3	8	9	1	23
MEDIUM HIGHER EDUC.	4	7	38	32	10	91
LONG HIGHER EDUC.	5	8	38	66	14	131
TOTAL	11	20	102	121	31	285

Table 3.3.57: Distribution of respondents by educational level according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Bryggebro.

Out of the Table 3.3.57, the SPSS calculated the Chi2 to be 17,047 with a degree of freedom (df) 20 and the missing values are 5. P is bigger than 0,250. Therefore, the variables are independent.

	VERY BAD	BAD	NEUTRAL	GOOD	VERY GOOD	TOTAL
01-20 YEARS	0	1	2	1	2	6
21-30 YEARS	3	3	27	26	8	67
31-40 YEARS	3	8	33	44	6	94
41-50 YEARS	3	2	22	28	7	62
51-60 YEARS	0	3	13	16	7	39
61-90 YEARS	2	3	4	6	0	15
TOTAL	11	20	101	121	30	283

Table 3.3.58: Distribution of respondents by age groups according to their opinion about the street design solutions (lightning, pavement material, greenery, etc) used in Bryggebro.

Out of the Table 3.3.58, the SPSS calculated the Chi2 to be 0,129 with a degree of freedom (df) 4 and the missing values are 10. P is bigger than 0,250. Therefore, the variables are independent.

4.0 general comparison

AGE

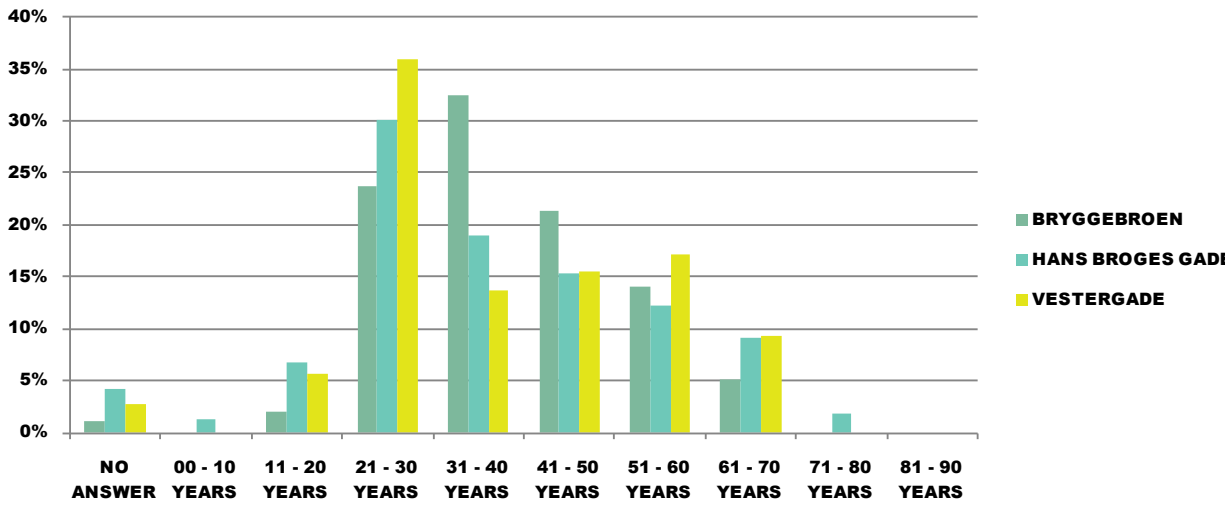


Figure 4.1: Distribution of the respondents by age

In comparison to Hans Broges Gade and Vestergade Vest and Mageløs, respondents from Bryggebro have the highest average age with 32% of them between 31 and 40 years old.

The average age from the respondents can be related to their educational level. Respondents with the highest average age at Bryggebro also have a higher educational level – 77% of them have a medium or longer high education.

GENDER

The distribution of respondents by gender is very balanced in Bryggebro where 50% of the respondents are males and 49% are females. The other two infrastructures present a larger difference between males and females.

In Hans Broges Gade, 52% of the respondents are male and 44% are female. Finally, 54% of the Vestergade Vest and Mageløs respondents are male and 44% are female.

There are several studies about gender and cycling behavior developed outside Denmark and the results highlight that gender has a predominant role over the individual decision to ride a bike (Moudona et al, 2005).

However, the results from the three web surveys developed in this research indicate that there is not a significant relationship between gender and how often an individual ride a bike. One of the reasons that gender is not a predominant factor in Denmark could be that bike culture is so wide spread across the country.

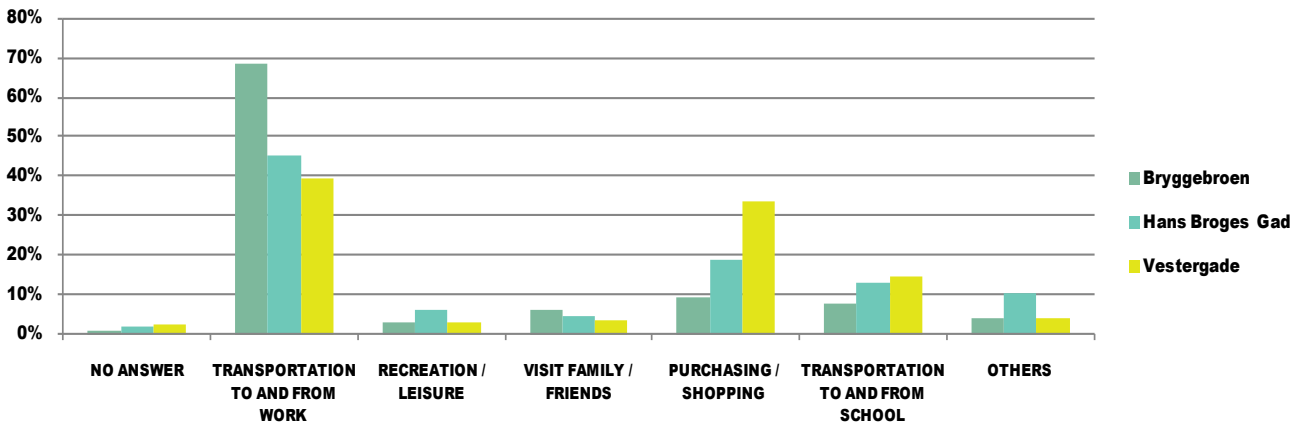


Figure 4.2: Distribution of the respondents in accordance to the main trip purpose when riding a bike at the infrastructure.

MAIN PURPOSE FOR BIKING

Bryggebro has the largest amount of respondents riding their bikes for commuting purposes. Among Bryggebro`s respondents, 70% ride their bikes at Bryggebro to go to work and 8% to go to study.

In contrast to Bryggebro, respondents from Vestergade Vest and Mageløs and Hans Broges Gade present a more balanced distribution of trip purpose when riding a bike at the infrastructures.

39% of the respondents from Vestergade Vest and Mageløs have said they ride a bike mostly to go to work and 13% going to study. It is still a high percentage of commuters, but the infrastructure also has another representative amount of respondents (33%) riding their bikes to go to shopping.

WALKING WITHOUT BIKE

In regards to the frequency that respondents walk in the studied infrastructures, the results from Figure 4.3 highlights that Bryggebro has a different profile in comparison to Hans Broges Gade and Vestergade Vest and Mageløs.

The built environment and uses where the infrastructures are located seems to have an influence in the use of them. Hans Broges Gade has the largest percentage of respondents (68%) living in a radius of 2 kilometres and the local residents both use the infrastructure for cycling and walking. On the other hand,

Bryggebro is mainly used for commuting and the majority of the respondents live more than 2 kilometres from the infrastructure. Therefore, it seems that most of individuals that ride a bike in Bryggebro do not use the infrastructure for walking.

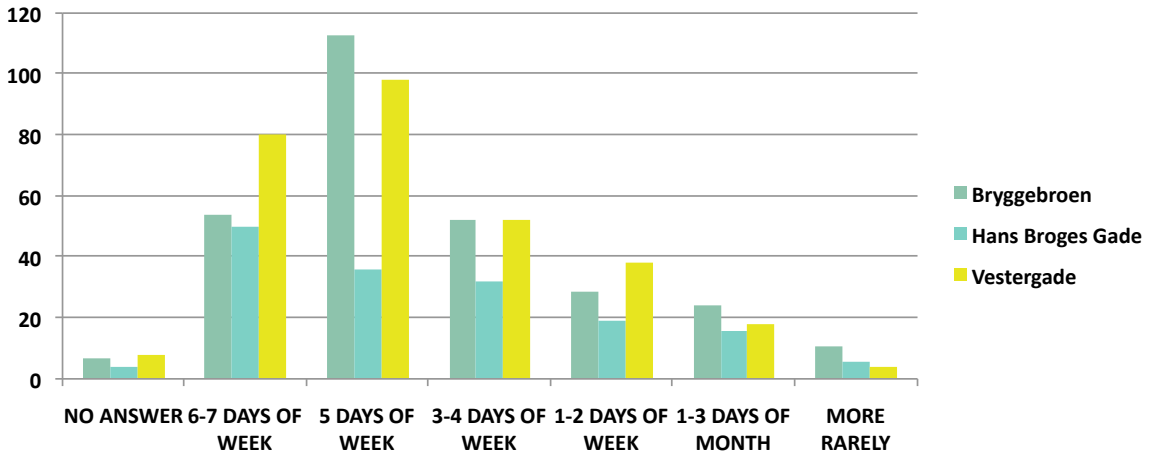


Figure 4.3: Distribution of the respondents in accordance to how often they ride a bike in the infrastructure.

CYCLING MORE OFTEN AND QUALITY INFLUENCING TO BIKE MORE OFTEN

Comparing the results from the three web surveys, the implementation of Bryggebro influenced the most quantity of respondents (30%) to start to ride a bike more often. In this context, it is important to take in consideration that the opening of Bryggebro created a new link between the two sides of Copenhagen harbor.

When respondents who started to bike more often after the intervention were asked for their motivations, there was a different pattern of answers in the three infrastructures.

45% of Bryggebros' respondents said that fast connectivity was the main reason that made them to start to ride a bike more often. Moreover, 91% of Bryggebros respondents said to be satisfied with the design solution of the infrastructure in regards fast connectivity. However, only 38% of respondents from Vestergade Vest and Mageløs were satisfied with it.

Enhancing fast connectivity, Bryggebro has a dedicated high speed lane connecting the two sides of the harbor. On the other hand, Vestergade Vest and Mageløs function as a shared-used space where cyclists need to negotiate the space with other transport modes during most of the day.

Despite the challenges faced by cyclists at Vestergade Vest and Mageløs, the majority of respondents that started to ride a bike more often after the intervention have mentioned fast connectivity as a main factor. And 33% of respondents were satisfied with the design solution in regards to fast connectivity.

In the case of Hans Broges Gade, respondents that started to bike more often after the intervention had mentioned safety as the main reason.

SATISFACTION WITH THE INFRASTRUCTURE

While the rate of respondents from Bryggebro and Hans Broges Gade who were dissatisfied with the infrastructures was respectively 1% and 8%, the rate of Vestergade Vest and Mageløs respondents dissatisfied was much higher (14%).

The different infrastructure typologies might have an influence in the result. Bryggebro and Hans Broges Gade design solutions segregated the different transport modes and present dedicated lanes for cyclists.

The intervention in Vestergade Vest and Mageløs is based on the concept of shared-use space where there are no dedicated bike lanes and the cyclists need to ne-

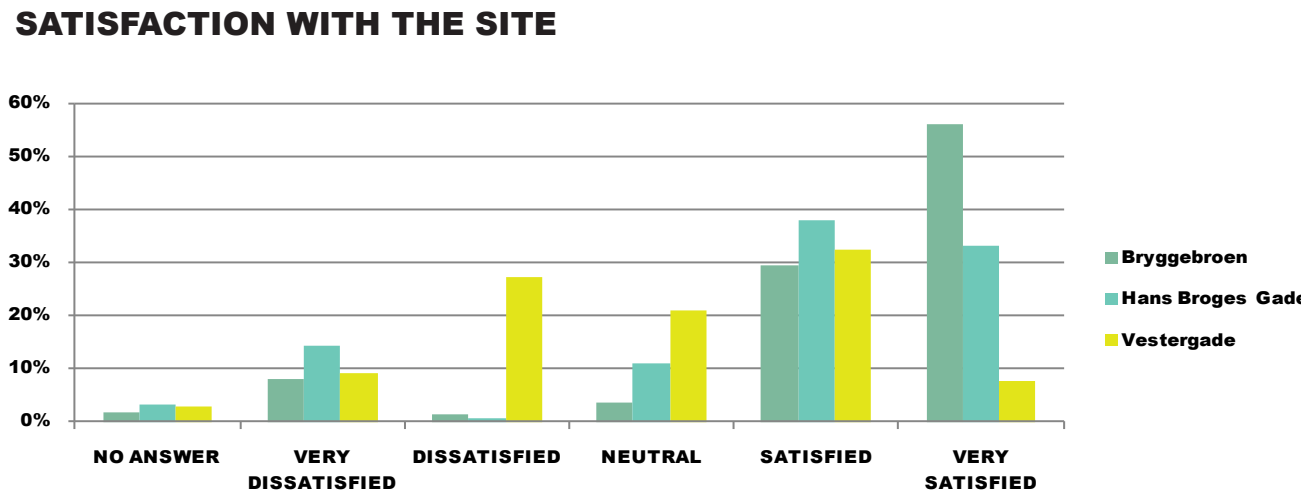


Figure 4.4: Distribution of the respondents in accordance to their satisfaction with the infrastructure design solution.

gotiate the space with pedestrians. The data collected from the count, local observation and newspapers articles indicate that Vestergade Vest and Mageløs function as a more challenging space, especially between 3pm and 5pm were the there is a large amount of both cyclists and pedestrians sharing the same space.

A shared-use space challenges the cyclists to learn how to negotiate their space with pedestrians and induces the cyclists to ride their bikes at a lower speed.

In general, the satisfaction of the respondents about the design solution of the infrastructures in regards to safety, conflict between travel modes, aesthetics and parking are similar to their satisfaction with the overall design.

SATISFACTION WITH DESIGN SOLUTION AS REGARDS SAFETY

The majority of the respondents from Bryggebro and Hans Broges Gade were satisfied with the infrastructures design in regards to safety. However, 11% and 7% of the respondents respectively from Bryggebro and Hans Broges Gade were very unsatisfied with the infrastructures.
At Vestergade Vest and Mageløs, half of the respondents were not satisfied with the infrastructure design in regards to safety. The negative response could be partially influenced by the profile of the infrastructure as a shared-use space. Vestergade Vest and Mageløs were not designed with dedicated bike lanes. It is a space where cyclists and pedestrians need to negotiate the space.

LACK OF AWARENESS FOR THE SURROUNDING CYCLISTS

According to 87% of respondents from Vestergade Vest and Mageløs, the lack of awareness of pedestrians for cyclists is problematic.

There is also a problem presented among Bryggebro`s respondents. 56 % of the respondents pointed out the lack of awareness of pedestrians for cyclists as a problem. Considering the design of the infrastructure and the field observation, the main problem might be the bridge gates that function as shared-use spaces.

There is an abrupt rupture between the dedicated bike lanes at the bridge and the gates functioning as shared-use spaces. The cyclists ride their bikes faster at the dedicated lanes. But when they enter the shared-use space, they are forced to slow down the speed.

BIKING MORE OFTEN AFTER THE INTERVENTION?

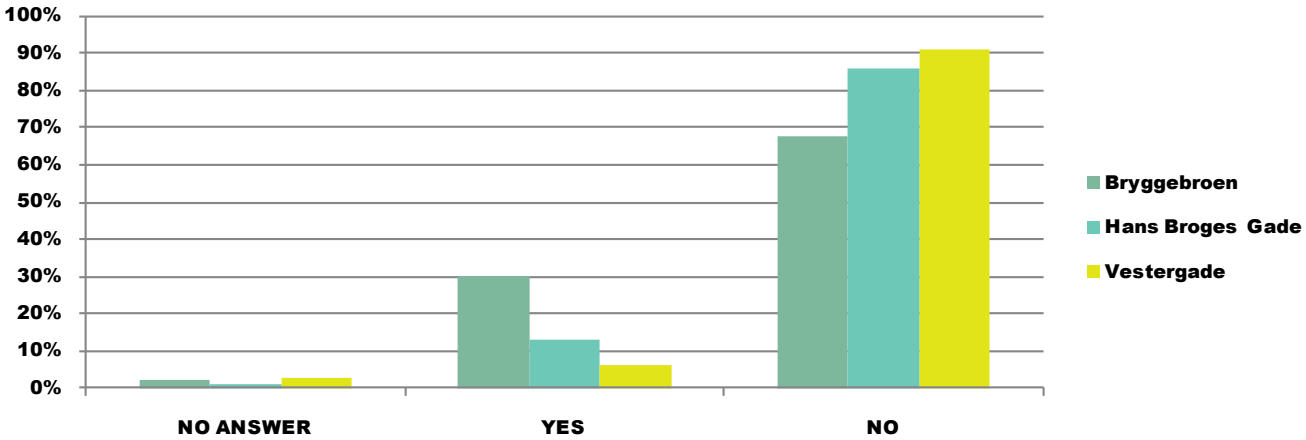


Figure 4.5: Distribution of the respondents in accordance to biking more often after the opening of the infrastructure.

CONFLICTS BETWEEN TRAVEL MODES

78% of the respondents from Vestergade Vest and Mageløs have also mention to be unsatisfied with conflicts between travel modes.

Vestergade Vest and Mageløs attract both cyclists and pedestrians who often have conflicting needs. At the shared-used space, cyclists need to slow down the velocity and be more aware of the surroundings. On the other hand, pedestrians are also affected by cyclists, who travel at higher speed and they also need to be more aware of the surroundings.

However, the conflicts on shared-use spaces are especially significant for people who cannot react quickly to hazards, such as elderly cyclists or cyclists with children. To improve the shared-use spaces experience for all users, designers must be aware of potential conflicts and implement innovative design solutions.

According to McMillen (2001), potential conflicts in shared-used spaces can be reduced by: providing information, especially signage, that clearly indicates permitted users and activities and ensuring that the space has sufficient width and an appropriate surface for everyone.

SATISFACTION WITH AESTHETICS

82% of the respondents considered the design of Bryggebro to be good or very good. The infrastructure is iconic and it functions as a landmark in the harborscape. These characteristics probably make cyclists more aware of the aesthetic quality of the infrastructure. Being an icon in the habourscape, the aesthetic of the infrastructure is probably recognized by cyclists and assumed as part of the city identity.

ILLEGALLY PARKED BIKES

More than half of the respondents (51%) from Vestergade Vest and Mageløs are dissatisfied with illegally parked bikes. The infrastructure concentrates a large amount of commercial establishments and the current amount of bike racks are not enough.

In the case of Hans Broges Gade, 19% of the respondents were dissatisfied with illegally parked bikes. The infrastructure does not have bike racks and all the bikes are just parked next to the facades. There is not a large concentration of bikes, but during the field observation there were several local residents complaining about bikes parked next to their facades.

RESIDENTIAL LOCATION OF RESPONDENTS

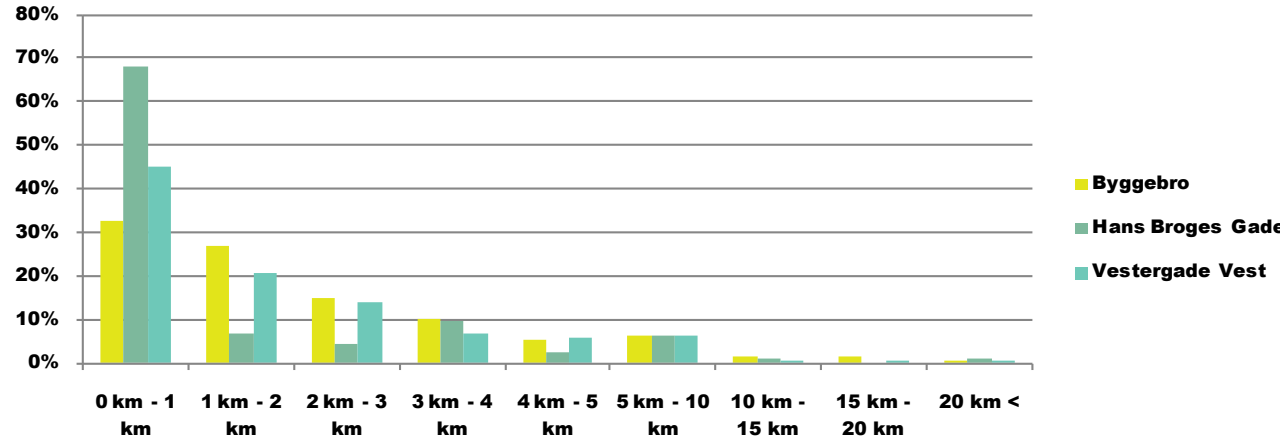


Figure 4.6: Distribution of the respondents in accordance to the distance from their residence to the infrastructure.

The spatial distribution of the residential location of the respondents suggests how far cyclists ride their bikes on their daily trips. In all the three cases, more than 80% of the respondents live less than 4 kilometres from the infrastructure where they were riding a bike. On the other hand, less than 5% of the respondents live more than 5 kilometres away from the infrastructure where they were riding a bike.

Hans Broges Gade has the highest concentration of respondents living within a 1 km radius (68%), while Bryggebro has the lowest (33%). These figures could be related to the profile of the infrastructures and their location. Bryggebro is a strategic commuting link in Copenhagen harbor and it could be seen as an in-between zone infrastructure – not having a neighborhood based character. Being part of the bike Holme corridor, Hans Broges Gade also functions as a commuting infrastructure. However, it has a much stronger neighborhood based character than Bryggebro.

RELATION BETWEEN SOCIO-DEMOGRAPHICS AND THE WEB-SURVEY ANSWERS

At the three infrastructures, the findings highlight a relationship between socio-demographics and trip purpose when riding a bicycle.

Despite distinct typologies and surroundings, the statistical treatment of the collected data using the Chi2 presented a strong similarity. The majority of the Chi2 test results indicated that socio-demographic factors would not be related to the individuals answers in regards to the design characteristics and satisfaction.

Neither was it possible to establish a relationship between socio-demographic variables and the relevance of design characteristics nor the satisfaction with the infrastructures.

One of the possible motives to the independency between socio-demographic factors and the respondents answers is the high level of subjectivity of the questions which deals with satisfaction and perception.

5.0 conclusion

The decision to use a web survey and flyers as main method to collect data had both advantages and disadvantages. The data was efficiently transferred to the data basis and the distribution of flyers was an efficient mode to contact cyclists without interrupting the flow of traffic.

On the other hand, the web survey based questionnaire did not allow for a very comprehensive questionnaire. Therefore, we had a limited number of questions.

The study aimed to give an overview in regards to what design characteristics would be relevant to individuals' decision to ride a bike. The quantitative analysis – mainly used in this study – provided indications of possible relevant design factors and also relations between socio-demographic factors and how design characteristics influence the individual decision to ride a bike.

The findings highlight important factors such as the relevance of fast connectivity and safety for cyclists. The results suggest that both fast connectivity and safety are strategic dimensions of a design solution that must be taken in consideration by architects, planners and engineers.

One of the goals of the report is to indicate how the design elements and infrastructures can help to promote cycling significantly, specifically in regards to the increased and decreased cycling frequencies which have been examined for each case. For example, the statistic analysis reveals how the relationship between age group and travel purpose can further enhance future biking infrastructures, for example younger cyclists are more likely to be traveling to study or school, whereas the older cyclists are traveling to work. Therefore future infrastructures could cater for this division creating faster, safer and less congested bike lanes.

Based on the comparison between the three case studies, the shared-used space seems to present more challenges for the cyclists who need to ride their bikes and, at the same time, negotiate their space with pedestrians. Shared-use spaces are not common in Denmark, but they can be an alternative way to create more lively cities enhancing a variety of experiences.

The findings indicate that purpose-built bicycle-only facilities are perceived by cyclists as safer environments to ride a bike.

The three studied typologies have both advantages and disadvantages and there is not one better than another. When deciding to implement or improve a bike infrastructure, the particular qualities and potentials of each typology should be analyzed in order to decide what kind of bike infrastructure would be appropriate to be implemented.

In the three case studies, the majority of respondents answered that they ride a bike in their respective infrastructures with the main purpose to go to work. The result indicates that different typologies or a conjugation of typologies can be efficiently used for commuting. What seems to be important is how fast the infrastructure connects the cyclists and how safe it is to ride a bike in the infrastructure.

In hindsight the benefits of an infrastructure rely on the diversity and contrast between the before and after circumstances, upon which these contrasts or differences can vary for individual typologies. Conceiving shared spaces for both cyclists and pedestrians will produce a totally different result in regards to an infrastructure where there was once a lot of motorized traffic than before when it was previously solely devoted to cyclists. The increased benefits of placing new bridge will be different to say building it close to an existing bridge as it provides a new connection further away from any other bridge infrastructure enabling cyclists to travel a new or even faster way to their destination.

Figure 5.1: Cyclists and pedestrians at Vestergade Vest.

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annex

FLYER DELIVERED TO CYCLISTS

ØNSKER DU EN BEDRE CYKELBY?

VI ER MIDT I ET FORSKNINGSPROJEKT OM CYKELBYEN OG MANGLER NETOP DIN HJÆLP TIL AT FORBEDRE DEN.

DET GØR DU VED AT SVARE PÅ FÅ SPØRGSMÅL PÅ:

www.detmangfoldigebyrum.dk/hansbrogesgade/

For yderligere information om projektet:
vsil@create.aau.dk

ALBORG UNIVERSITET

ØNSKER DU EN BED-

VI ER MIDT I ET FORSKNINGSPROJEKT OM CYKELBYEN OG MANGLER NETOP DIN HJÆLP TIL AT FORBEDRE DEN.

DET GØR DU VED AT SVARE PÅ FÅ SPØRGSMÅL PÅ:

WWW.SURVEY-CYKEL.DK

For yderligere information om projektet:

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ØNSKER DU EN BEDRE CYKELBY?

VI ER MIDT I ET FORSKNINGSPROJEKT OM CYKELBYEN OG MANGLER NETOP DIN HJÆLP TIL AT FORBEDRE DEN.

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vsil@create.aau.dk

ALBORG UNIVERSITET

SURVEY ACCESSED ON THE WEBSITE

DO YOU WISH A BETTER CITY FOR CYCLING?

AALBORG UNIVERSITET

We are in the middle of a research project about cycling in the city and need your help. The only thing you have to do is answer a few questions. Answer now and you have the chance to win a **new bike valued at 3500 DKK**. The entries will be drawn on the 31th of October 2010 with the winner contacted by e-mail.

For further information about the project you can contract vsil@create.aau.dk

01 Home address

02 Email address

03 Age

04 Gender

- Male
- Female

05 Level of education

- Primary school
- Vocational education
- High school
- Short high education

- Medium high education
- Long high education

06 How often do you ride a bicycle at Hans Broges Gade?

- 6-7 days of week
- 5 days of week
- 3-4 days of week
- 1-2 days of week
- 1-3 days of months
- More rarely

07 How often do you walk at Hans Broges Gade?

- 6-7 days of week
- 5 days of week
- 3-4 days of week
- 1-2 days of week
- 1-3 days of months
- More rarely

08 What is your main purpose at Hans Broges Gade?

- Transportation to and from work
- Recreation / leisure
- Visiting family / friends
- Purchasing / shopping
- Transportation to and from school
- Others

09 How often do you use the bike for the purpose in question 08 after the opening of Hans Broges Gade?

- ○ More rarely
- ○ Not as often
- ○ Just as often as before
- ○ More often
- ○ Much more often

10 How satisfied are you with Hans Broges Gade?

- ○ Very dissatisfied
- ○ Dissatisfied
- ○ Neutral
- ○ Satisfied
- ○ Very satisfied

11 How do you think the design solution has fulfilled the following parameters of the infrastructure?

Safety	○ Very bad	○ Bad	○ Neutral	○ Good	○ Very good
Fast connection	○ Very bad	○ Bad	○ Neutral	○ Good	◉ Very good
Aesthetics / beauty	○ Very bad	○ Bad	○ Neutral	○ Good	○ Very good

12 Evaluate how problematic the following situations are when cycling at Hans Broges Gade?

Illegally parked bicycles	○ Not problematic	○ A bit problematic	○ Problematic	○ Quite problematic	○ Major problem

Conflicts between bicycle paths, sidewalks and traffic lane	Not problematic	A bit problematic	Problematic	Quite problematic	Major problem
Obstacles	Not problematic	A bit problematic	Problematic	Quite problematic	Major problem
Holes in the pavement	Not problematic	A bit problematic	Problematic	Quite problematic	Major problem
Cracks in ramps and where different path and roads meet	Not problematic	A bit problematic	Problematic	Quite problematic	Major problem
Lack of awareness from other biking people biking	Not problematic	A bit problematic	Problematic	Quite problematic	Major problem
Poor signposting and interpretation	Not problematic	A bit problematic	Problematic	Quite problematic	Major problem
Lack of scenic and greenery	Not problematic	A bit problematic	Problematic	Quite problematic	Major problem

13 Are you biking more often after the opening of Hans Broges Gade?

- Yes
- No

14 If yes, what are the main qualities about Hans Broges Gade that have affected your choice to bike more often?

- Safety
- A good experience
- Faster connection
- Wider bike lanes
- Greener areas
- Faster bike lanes
- Green wedge
- Attractive landscape

- [ ] Better signposting
- [ ] Bike maps
- [ ] Maintenance of bike lanes
- [ ] Bike parking

15 How important is street design (greenery, lightning, pavement etc.) for your decision to ride here?

- ○ Not at all important
- ○ Not important
- ○ Neutral
- ○ Important
- ○ Very important

16 What is your opinion about Hans Broges Gade design solution (greenery, lightning, pavement etc.)?

- ○ Very bad
- ○ bad
- ○ Neutral
- ○ Good
- ○ Very good

17 Would you like to add any comments to this questionnaire?

Thank you for answering this questionnaire.

Please, push the bottom below to end.

Afslut spørgeskema

bike infrastructures

Bike Infrastructures aims to identify bicycle infrastructure typologies and design elements that can help promote cycling significantly. It is structured as a case study based research where three cycling infrastructures with distinct typologies were analyzed and compared. The three cases are Vestergade Vest and Mageløs in Odense (shared-use space in the core of the city); Hans Broges Gade in Aarhus (an extension of a bicycle route linking the suburb to Aarhus Central station) and Bryggebro in Copenhagen (a bridge for bicyclists and pedestrians crossing the harbor). Bridging research and policy, the findings of this research project can also support bike friendly design and planning, and cyclist advocacy.

Bike Infrastructures was developed in the Department of Architecture and Design at Aalborg University. It is a product of the research project titled Bikeability – financed by the Danish Council for Strategic Research.

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