By Charlotte Cammelbeeck

TU Delft

Erasmus MC

SVP

TNO
INTRODUCTION

THEORETICAL FRAMEWORK

ANALYSIS OF SPIJKENISSE

URBAN DESIGN: SPIJKENISSE’S ROUTE TOWARDS ACTIVE AGEING

CONCLUSIONS
PART I. INTRODUCTION
MOTIVATION | POPULATION AGEING

1950 8%

2010 11%

2040 22%

1950 7,5%

2010 15,3%

2040 25,9%

(CBS, 2010; United Nations, 2010)
MOTIVATION | THE BUILT ENVIRONMENT

babyboom + rising life expectancy = ?

INTRODUCTION | THEORETICAL FRAMEWORK | ANALYSIS OF SPIJKENISSE | URBAN DESIGN | CONCLUSION
PHYSICAL FRAILTY
Difficulty walking;
Difficulty maintaining balance;
Poor hearing;
Poor vision;
etc.

PSYCHOLOGICAL FRAILTY
Problems with memory
Feeling down
Feelings of anxiety
etc.

SOCIAL FRAILTY
Lack of a partner or trusted confidant
Lack of support
Low participation in social networks such as family
etc.

FUNCTIONAL DISABILITY
ADMISSION TO AN INSTITUTION
DEATH
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PROBLEM FIELD | ACTIVE AGEING POSTPONING AND REDUCING FRAILTY

ACTIVE AGEING

PHYSICAL FRAILTY
- Difficulty walking;
- Difficulty maintaining balance;
- Poor hearing;
- Poor vision;
- etc.

PSYCHOLOGICAL FRAILTY
- Problems with memory
- Feeling down
- Feelings of anxiety
- etc.

SOCIAL FRAILTY
- Lack of a partner or trusted confidant
- Lack of support
- Low participation in social networks such as family
- etc.

FUNCTIONAL DISABILITY

ADMISSION TO AN INSTITUTION

DEATH

(Ruuskanen and Ruoppila, 1995; Mahmood et al., 2012)
Active ageing describes the desire and ability of elderly to be and stay physically active. Additionally, active ageing includes social participation and engagement in daily economic activities, such as going to the supermarket.

(Michael, Green and Farquhar, 2006)
48 per cent of women and 34 per cent of men age 65 years or older did not engage in sufficient regular physical exercise as recommended by Dutch guidelines.

(Statistics Netherlands, 2007)
Physical aspects of neighbourhoods may influence physical activity levels and walking behaviour among residents and urban design can be a powerful tool for improving the overall health of residents.

(Mahmood et al., 2012; Michael, Green and Farquhar, 2006; van Lenthe, Burg and Mackenbach, 2005; Borst et al., 2009; Jackson, 2003; Burton, Mitchell and Stride, 2011)
Walking is the most common form of transportation and exercise for elderly. As a consequence, the neighbourhood environment becomes increasingly significant for frail elderly. Furthermore, declining health and functional status can make frail elderly more susceptible to barriers in the built environment.

(Bjornsdottir, Arnadottir and Halldorsdottir, 2011; Mahmood et al., 2012; Mollenkopf et al., 2004; Rooij and Tacken, 1998)

(Burton and Mitchell, 2006)
Percentage of people in the Netherlands over 75 years of age in care- and nursing homes 1995-2007

Percentage of 55+ people in the Netherlands interested to live in a building with same age group

(Lijzinga, Depenbrock and Hendriks, 2009; Iersel and Leidelmeijer, 2010)
The preliminary phase: The reconstruction period


(Wellenberg, 2010; Spijkenisse Online, n.d.)
PROBLEM FIELD | ORIGINAL INHABITANTS BECOMING THE ELDERLY OF TOMORROW

(CBS, 2009)
Suburban public space; quiet streets and the life between buildings has been phased out.

(Reijndorp, Bijlsma and Nio, 2012; Gehl, 2011)
PROBLEM FIELD | GROWING DISTANCE TO FACILITIES

The neighbourhood principle scheme by Clarence Perry

Neighbourhood principle scheme used in the 1950s

Urban renewal of the city centre, shift of facilities

(American Society of planning officials, 1960; Provoost and Rottenberg, 2007; Gemeente Spijkenisse, 2012)
RESEARCH QUESTION

What kind of spatial interventions in the public space are required to enhance the independence of frail elderly within the current context of Dutch neighbourhoods?

Welke type ruimtelijke interventies in de openbare ruimte zijn noodzakelijk om de zelfstandigheid van kwetsbare ouderen in de bestaande Nederlandse buurten te bevorderen?
This research draws primarily on recent peer-reviewed literature in a broad array of urbanism and gerontology fields. Which neighbourhood design interventions in the public space encourage frail elderly to age actively?

Theoretical underpinning graduation project:
- Theory paper
- Definition analysis parameters

EMPIRICAL RESEARCH
- Interviews
- GPS tracking

DESIGN PRINCIPLES
- Design for the public space
  - Plans/maps
  - Sections
  - Renderings
  - Models
- Collection of design principles
  - Pattern catalogue filled with design principles for elderly friendly public spaces

URBAN DESIGN
- Testing urban design principles in representative types of public spaces in the case of Spijkenisse, resulting in designs for the public space of exemplary locations.

LITERATURE RESEARCH
- Which urban design principles or patterns are essential for practitioners to create elderly friendly public spaces that stimulate active ageing?
- Which urban design principles or patterns need to be embedded into the current context of Spijkenisse in order to create easy accessible public spaces for elderly?
PART II.
THEORETICAL FRAMEWORK: URBAN DESIGN ENCOURAGING ACTIVE AGEING
LITERATURE | SIX THEMES

familiarity

legibility

comfort

distinctiveness

accessibility

safety
When designing familiar neighbourhoods, changes should be small and incremental and buildings and features should reflect the local style.

(Burton and Mitchell, 2006; Calkins, 1988; Patoine and Mattoli, 2001)
Accessible neighbourhoods should have local services, facilities and public transport on a walkable distance of a maximum of 800 meters.

(Bjornsdottir, Arnadottir and Halldorsdottir, 2011; Burton and Mitchell, 2006; Carstens, 1985; Gehl, 2011; Llewelyn-Davies, 2000; Mahmood et al., 2012; Michael, Green and Farquhar, 2006; Mollenkopf et al., 2004; Pearce, 1982; Rantakokko et al., 2012; Temelova and Dvorakova, 2012)
Design aspects that add to distinctiveness include the presence of a variety of architectural styles within one block, historical markers and curved streets.

(Burton and Mitchell, 2006)
A legible neighbourhood preferably has an irregular grid pattern. The street pattern should be supported on street level by clear signs and symbols and buildings reflecting their use with visible and obvious entrances.

(Burton and Mitchell, 2006; Michael, Green and Farquhar, 2006; Gehl, 2011)
Intervention that help elderly feel more comfortable are widening sidewalks, creating buffer zones between sidewalk and streets and adding bench that provide places to rest.

(Michael, Green and Farquhar, 2006; Mahmood et al., 2012)
Important safety related design interventions are; separate bicycle lanes and wide, well-lit, plain and smooth footways and controlled pedestrian crossings.

(Burton and Mitchell, 2006; Jackson, 2003)
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- Diverse architecture
- Small blocks
- Landmarks
- Familiarity
- Legibility
- Accessibility
- Safety
- Comfort

- City
- Neighborhood
- Street
- Micro scale (curb)

- Incremental and small scale change
- Irregular grid pattern
- Hierarchical streets
- Lively green spaces and squares
- Proximity of public transport
- Walkable distance to facilities
- Mixed use neighbourhoods
- Direct routes
- Informal green spaces and squares
- Quiet routes and zones

- Avoid crossroads
- Gently winding streets
- Short streets
- Small blocks
- Landmarks
- Buildings facing the street
- Mixed use streets
- Clear street zoning
- Signal-controlled crossings
- Traffic islands

- Reflect local style
- Gently winding streets
- Relatively narrow streets
- Diverse architecture
- Buildings reflecting their use
- Visible and obvious entrances
- Environmental features
- Clear signs and symbols
- Gentle unavoidable changes in level
- Maintenance
- Smooth street pavement
- Small and smooth grates and drains

- Proximity of public transport
- Walkable distance to facilities
- Mixed use neighbourhoods
- Direct routes
- Informal green spaces and squares
- Quiet routes and zones

- Clear street zoning
- Signal-controlled crossings
- Traffic islands
- Assign parking spaces
- Wide sidewalks
- Green barriers and buffers
- Street lights
- Sheltering bus and tram stops
- Accessible public toilets
- Comfortable public seatings
- Devoid of clutter

- Spectacle
- Legibility
- Distinctiveness
- Accessibility
- Safety
- Comfort

- City
- Neighborhood
- Street
- Micro scale (curb)
DESIGN PRINCIPLES

design principles for

greying
cities

design principle catalogue
by Charlotte Cammelbeeck

TU Delft
PART III.
ANALYSIS OF SPIJKENISSE
ANALYSIS | DESIGN METHODOLOGY

Parameters found in literature

Urban analysis Spijkenisse

Urban analysis neighbourhoods

Strength

Opportunities

Threats

Weakness

++

+-

-+

--

Problem field + Design task definition

Design alternatives + development phases

Research by design

Designs for the public space of exemplary and strategic locations:
- routes
- zones

Data analysis interviews

Data analysis interviews

Data analysis GPS tracks

Physical activity diaries

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-
ANALYSIS | THREE CHOSEN NEIGHBOURHOODS FOR DESIGN

Centre
Sterrenkwartier
de Akkers

(google maps, 2012)
ANALYSIS | HIGH AMOUNT OF PARTICIPANTS + ELDERLY IN GENERAL

homes of 437 participants of the Erasmus MC interviews

homes 131 participants of the first round of Erasmus MC interviews that are frail according to the ISAR method
Answer: How would you define your neighbourhood?
ACCESSIBILITY | THREE NEIGHBOURHOOD WITH THEIR OWN CENTRE

LEGEND
- - - - - - 800 m radius
----- 500 m radius

sports-community
elderly-community
parking
religious
institutions
cafe/restaurant
physical therapist
hairdresser
atm/bank
postofice
cemetery
bus stop
metro stop
town hall
theatre
library
apothecary
GP
hospital
supermarket
butcher
bakery
letterbox

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ACCESSIBILITY | PUBLIC TRANSPORT CONNECTED TO FACILITIES, METRO REGIONAL CONNECTION

LEGEND
- bus lines
- bus stops
- metro line
- metro station
- facilities
- Pick up points Wmo bus (public support bus)
- built environment of Spijkenisse

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SAFETY | RESEARCH DONE BY THE MUNICIPALITY: GENERAL SENSE OF SAFETY IS LOW
CENTRE

(van der Meer, 2011)
ACCESSIBILITY | FACILITIES CONCENTRATED IN THE INNER CITY

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ACCESSIBILITY | INTERVIEWS: HIGH SCORE ACCESSIBILITY

Legend:
- yes
- no
- I don’t know
- irrelevant
- no answer

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INTRODUCTION | THEORETICAL FRAMEWORK | ANALYSIS OF SPIJKENISSE | URBAN DESIGN | CONCLUSION
LEGIBILITY, DISTINCTIVENESS, FAMILIARITY | LACK OF DIRECT ROUTES TOWARDS THE CENTRE
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LEGIBILITY, DISTINCTIVENESS, FAMILIARITY

WHEN CLOSED THE SHOPPING MALLS BLOCK MAIN WALKING ROUTES
I am afraid of crime and being bothered when I walk through my neighbourhood in the dark.

In my neighbourhood the footways are badly accessible.

My neighbourhood is badly maintained.

I am concerned with traffic safety when I walk through my neighbourhood.

At night the neighbourhood streets are not sufficiently lid.
ACCESSIBILITY | SUFFICIENT AMOUNT OF FACILITIES MAINLY LOCATED IN NEIGHBOURHOODS CENTRE

LEGEND
- bus stop
- metro stop
- GP
- supermarket
- sports community
- parking
- cafe/restaurant
- gym
- physical therapist
- hairdresser
- atm/bank
- walking route
- neighbourhood road
- main neighbourhood road
- city road
- elevated metroline

INTRODUCTION | THEORETICAL FRAMEWORK | ANALYSIS OF SPIJKENISSE | URBAN DESIGN | CONCLUSION
ACCESSIBILITY | DISAPPEARANCE OF FACILITIES, CENTRE TURNED INWARDS
### Accessibility

#### Remarkable Low Score Park

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#### Legend
- **Yes**
- **No**
- **I don’t know**
- **Irrelevant**
- **No answer**

#### Introduction

- Theoretical Framework
- Analysis of Spijkenisse
- Urban Design
- Conclusion
LEGIBILITY, DISTINCTIVENESS, FAMILIARITY | MODERNIST APPROACH LEADING TO LACK OF CONNECTIONS
LEGIBILITY, DISTINCTIVENESS, FAMILIARITY | MAIN CITY ROADS FORMING BORDERS
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LEGIBILITY, DISTINCTIVENESS, FAMILIARITY | POTENTIAL OF CENTRAL AXIS
I am afraid of crime and being bothered when I walk through my neighbourhood in the dark.
In my neighbourhood the footways are badly accessible
My neighbourhood is badly maintained
I am concerned with traffic safety when I walk through my neighbourhood
At night the neighbourhood streets are not sufficiently lit

SAFETY | RELATIVELY GOOD SCORE ON SAFETY

SPIJKENISSE

Sterrenkwartier

LEGEND
- Yes
- No
- I don’t know
- Irrelevant
- No answer
ACCESSIBILITY | HIGH AMOUNT OF FACILITIES LOCATED AROUND THE METRO STATION
ACCESSIBILITY | HIGH SCORE ON ACCESSIBILITY

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LEGEND
- yellow: Yes
- gray: No
- gray dashed: I don't know
- gray dashed: Irrelevant
- gray circle: No answer

Scores:
- High score on accessibility
- 80%
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| LEGIBILITY, DISTINCTIVENESS, FAMILIARITY | HIGH AMOUNT OF DEAD END STREETS |

**LEGEND**

- 1976-1985
- 1986-1995
- 1996-2005
- after 2006
- trees
- grass
- water
- covered passageway
- walking route
- neighbourhood road
- main neighbourhood road
- city road
- elevated metroline
LEGIBILITY, DISTINCTIVENESS, FAMILIARITY | POTENTIAL OF THE AXIS OVER THE DIKE

INTRODUCTION THEORETICAL FRAMEWORK ANALYSIS OF SPIJKENISSE URBAN DESIGN CONCLUSION
SAFETY | LOW SCORE ON SAFETY

Spijkenisse

- I am afraid of crime and being bothered when I walk through my neighbourhood in the dark.
- In my neighbourhood the footways are badly accessible.
- My neighbourhood is badly maintained.
- I am concerned with traffic safety when I walk through my neighbourhood.
- At night the neighbourhood streets are not sufficiently lit.

De Akkers

- I am afraid of crime and being bothered when I walk through my neighbourhood in the dark.
- In my neighbourhood the footways are badly accessible.
- My neighbourhood is badly maintained.
- I am concerned with traffic safety when I walk through my neighbourhood.
- At night the neighbourhood streets are not sufficiently lit.

LEGEND
- Yes
- No
- I don’t know
- Irrelevant
- No answer
SAFETY | LACK OF SOCIAL CONTROL ON STEETS
GPS TRACKINGS AND DAILY ACTIVITY DIARIES | 28 PARTICIPANTS OF THE THREE NEIGHBOURHOODS

GPS tracking + Daily activity dairy
OUTDOOR MOBILITY GOALS | WALKABLE DISTANCE TO FACILITIES, MIXED AGE NEIGHBOURHOODS, ATTRACTIVE PUBLIC SPACE FOR WALKING IN GENERAL

- Shopping: 40%
- Friend + family: 16%
- No goal: 18%
- Health care: 8%
- Sports: 4%
- Civil amenities: 9%
- Entertainment: 1%
- Park: 3%
- Cafe + restaurant: 1%

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OUTDOOR MOBILITY GOALS | Frail elderly: importance of friends, family and elderly specific facilities

**Legend**
- frail
- none frail

**Chart Description**
- No goal: 20% frail, 17% none frail
- Elderly specific facilities: 9% frail, 14% none frail
- Public facilities: 46% frail, 38% none frail
- Civil amenities: 14% frail, 11% none frail
- Friends + family: 11% frail, 11% none frail
LEGEND
- location of outdoor mobility goals
- GPS track equaling one journey by car or public transport

INTRODUCTION | THEORETICAL FRAMEWORK | ANALYSIS OF SPIJKENISSE | URBAN DESIGN | CONCLUSION
Location of outdoor mobility goals
GPS track equaling one journey by bike or on foot
Frail elderly stay more within their own neighbourhood.
UNCLEAR URBAN STRUCTURE BETWEEN NEIGHBOURHOODS FOR PEDESTRIANS AND CYCLISTS
DESIGN TASK DEFINITION

Urban analysis

neighbourhoods

Strength

++

Weakness

+-

Threats

--

Problem field

+ Design task definition
Making use of the centrality of facilities and when necessary strengthening the neighbourhood centres
Connecting the central facilities to the existing neighbourhood axis
Improving the road structure and network of public spaces by connecting them to the central neighbourhood axes.
Improving the accessibility of the neighbourhoods for slow traffic
Connecting the centres of the neighbourhoods and their facilities
Improving social safety by removing or replacing high maintenance greens, make building face the street and combining different types of transportation.
PART IV.
URBAN DESIGN: SPIJKENISSE’S ROUTE TOWARDS ACTIVE AGEING
DESIGN | SLOW TRAFFIC ROUTE CONNECTING THE NEIGHBOURHOODS EN THEIR CENTRES
DESIGN | COMFORTABLE, SAFE AND RECOGNIZABLE MATERIALISATION

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PHASE 1 | IMPROVING THE INTERNAL STRUCTURE
PHASE 1 | CENTRE - STADHUISPASSAGE

19 signal controlled crossings

31 buildings facing the street
32 visible and obvious entrances

05 direct routes
15 small blocks

38 smooth street pavement
39 small grates and drains
CURRENT SITUATION | STERRENKWARTIER - CENTRE
PHASE 1 | STERRENKWARTIER - CENTRE
PHASE 1 | STERRENKWARTIER - CENTRE

09 walkable distance to facilities

05 direct routes
29 wide sidewalks
38 smooth street pavement
39 small grates and drains

20 traffic islands
CURRENT SITUATION | STERRENKWARTIER - CENTRE
PHASE 1 | STEERENKWARTIER - CENTRE

- 26 street lights
- 36 comfortable public seatings
- 29 informal green spaces and squares
- 38 smooth street pavement
PHASE 1 | DE AKKERS - NIEUWE WESTDIJK

- 22 clear street zoning
- 25 wide side walks
- 38 smooth street pavement
- 36 comfortable public seatings
- 30 maintenance
PHASE 2 | CONNECTING THE NEIGHBOURHOODS
CURRENT SITUATION | STERRENKWARTIER - CENTRE
PHASE 2 | STERRENKWARTIER - CENTRE

19 signal controlled crossings
25 wide sidewalks
22 clear street zoning
38 smooth street pavement
22 clear street zoning

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THEORETICAL FRAMEWORK
ANALYSIS OF SPIJNENISSE
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31 buildings facing the street
PHASE 3 | STERRENKWARTIER - CENTRE NEIGHBOURHOOD
PHASE 3 | STERRENKWARTIER - CENTRE NEIGHBOURHOOD

05 direct routes

31 buildings facing the street
09 walkable distance to facilities
21 clear signs and symbols
32 visible and obvious entrances
REFLECTION ON DESIGN | FEASIBILITY + PRECONDITIONS FOR EASY ACCESSIBLE AND ELDERLY FRIENDLY PUBLIC SPACES IN SPIJKENISSE

Preservation + strengthening neighbourhood centres such as Sterrenkwartier

Concept of interest for other locations in Spijkenisse

Improve traffic safety

Adding comfortable places to rest

Preferably small scale changes to maintain familiarity with the neighbourhood + more feasible

Maintain and remove greens affecting the safety on the streets
PART V.
CONCLUSIONS
Welke type ruimtelijke interventies in de openbare ruimte zijn noodzakelijk om de zelfstandigheid van kwetsbare ouderen in de bestaande Nederlandse buurten te bevorderen?

Reducing frailty enhances independence, therefore promote active ageing.

Use of principles based on context of the design location

Maintain vegetation around and pavement on walking routes

Widen sidewalks and remove obstacles

Preserve neighbourhood centres

And places to rest

Work together with different fields

Interventions summarised and suitable for the practice of designers and planners

Greying cities

CONCLUSION
greying cities

spatial strategies for residential neighbourhoods to promote active ageing

By Charlotte Cammelbeeck