CYCLISTS' STRESS IN REAL-WORLD CONDITIONS: PRELIMINARY MEASUREMENTS IN A BRAZILIAN MEDIUM-SIZED CITY

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EESC · USP
Transportes
KIT
WP3 - Perspectives and Challenges for the Promotion of Cycling Infrastructure

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São Paulo, November 2017
Malha ciclovíária nas capitais

Em 3 anos, vias mais que dobraram de tamanho

São Paulo 436,4
Rio de Janeiro 431,3
Brasília 420,1
Fortaleza 204,6
Curitiba 204,2
Rio Branco 178,3
Salvador 140,1
Campo Grande 89,7
Belem 88,4
Belo Horizonte 87,4
Goiânia 84,2
Aracaju 67
Vitória 48,2
Porto Alegre 47
Macapá 42,1
Teresina 41,9
Recife 41,7
Florianópolis 41
João Pessoa 40,7
Cuiabá 39,9
Boa Vista 38
Natal 32
Porto Velho 26,6
Manaus 20,5
Palmas 19,5
São Luís 18
Macapá 11,9

3.009
é o total de km de malha ciclovíária nas capitais

Fonte: prefeituras das capitais e governo do DF

Infográfico elaborado em: 17/02/2017
Research question

NEW CYCLING FACILITIES

Are planning strategies adopted by Brazilian cities in the last few years effective (compatible with user’s needs)?
Planning strategies

HARDWARE
(pathways, parking)

+ 

SOFTWARE
(policies, practices, governmental support)

Successful pathways for stimulating cycling
Objective

Where?

- São Carlos and São Paulo (São Paulo state, Brazil)
- Groningen, Amsterdam and Houten (The Netherlands)
- London (UK)
Method

- Literature review
- Field research
  - Planning strategies
  - Environmental exposure of cyclists
- Comparison of results
DePICT – How are walking and cycling infrastructures experienced and created?

The DePICT project, Designing and Policy Implementation for encouraging Cycling and walking Trips, aims to determine which features of urban environments, local communities, and the governance of physical infrastructures influence walking and cycling and how these can be optimised to achieve sustainable urban mobility for all.

Find out more >
Method

Field research

A. Role of user’s perception in planning strategies adopted by the studied cities

B. Measurement of environmental exposure of cyclists in São Carlos and São Paulo
Cycling infrastructures in the city of São Carlos

until 2009
Cycling infrastructures in the city of São Carlos until 2010
Cycling infrastructures in the city of São Carlos until 2011
Cycling infrastructures in the city of São Carlos until 2012
Cycling infrastructures in the city of São Carlos until 2013
Cycling infrastructures in the city of São Carlos until 2014
Method

Field research

A. Role of user’s perception in planning strategies adopted by the studied cities

B. Measurement of environmental exposure of cyclists in São Carlos and São Paulo
Assessment of cyclists' exposure to noise in a Brazilian medium-sized city

THIAGO Cunha Ramos

THAIS de Cássia Martinelli Guerreiro
LÉA Cristina Lucas de Souza

LUC Dekoninck
DICK Botteldooren
Cycling network (CN) in São Carlos-SP – Source: PMSC, 2015
Data Acquisition

TUESDAY
7h30
17 km
17h30

WEDNESDAY

THURSDAY
Data Acquisition
15 CAMPAIGNS
1200 NODES
20 meters
274 NODES
926 NODES
Results

Location of values above the noise exposure limits
1200 NODES

539 NODES > 75 dBA

128 NODES > 85 dBA

SPATIAL ANALYSIS

$L_{Aeq}$

11 NODES > 85 dBA

6 NODES > 85 dBA

4 records

3 records

2 records
Stress!
Stress...

...a physical, chemical, or emotional factor that causes physical or mental tension and may be a factor in disease causation
FIGHT or FLIGHT
Parasympathetic
- Eyes: Constrict Pupil
- Salivary Glands: Stimulates Salivation
- Heart: Slows Heartbeat
- Lungs: Constrict Bronchi
- Stomach: Stimulates Digestion
- Liver: Stimulates Bile Release
- Intestines: Stimulate Peristalsis and Secretion
- Bladder: Contracts Bladder

Sympathetic
- Eyes: Dilate Pupil
- Salivary Glands: Inhibit Salivation
- Heart: Accelerates Heartbeat
- Lungs: Dilate Bronchi
- Stomach: Inhibits Digestion
- Liver: Stimulates Glucose Release
- Kidneys: Stimulate Epinephrine and Norepinephrine Release
- Intestines: Inhibit Peristalsis and Secretion
- Bladder: Relaxes Bladder
FIGHT or FLIGHT
FIGHT or FLIGHT
In summary...

Skin temperature

Skin conductance
Stress!
(BAUMAN et al., 2008; CAIRNS; SLOMAN; NEWSON, 2004; GÄRLING; SCHUITEMA, 2007; DANISH MINISTRY OF TRANSPORT AND ENERGY, 2007; DILL; CARR, 2003; KILLORAN et al., 2006; UK NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE, 2008)
Preliminary objective

Measure stress levels of a cyclist in São Carlos in and out dedicated infrastructure
Instruments
Equipment used for data collection
Routes
Tuesday
Wednesday
Wednesday
Thursday

7am to 9 am
5 pm to 7 pm
Preliminary results
Morning
Route 1

Tuesday

Wednesday

Thursday
Morning
Route 2

Tuesday

Wednesday

Thursday
Afternoon

Route 2

Tuesday

Wednesday

Thursday
Next steps
Timeline of stress

3 common stress points
Timeline of stress

Tuesday

Wednesday

Thursday

2 common stress points
Stress in and out dedicated cycling infrastructures

Stress points/km < Stress points/km

Stress magnitude < Stress magnitude
Heatmap ROUTE 1
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