



Ottawa Cycling Safety Study

Study Completion Presentation

April 12th, 2011

What we'll talk about

- The cycling context
- Project goals
 - Achieving goal #1
 - Achieving goal #2
 - Achieving goal #3
- Project status
- Next steps

The Cycling Context



Ottawa's Cycling Plan

- Central goal:
 - “encourage more people to cycle more often”

- OCP key recommendations:
 - Develop proposed cycle network
 - Maintain and improve existing facilities

Encouraging Cycling

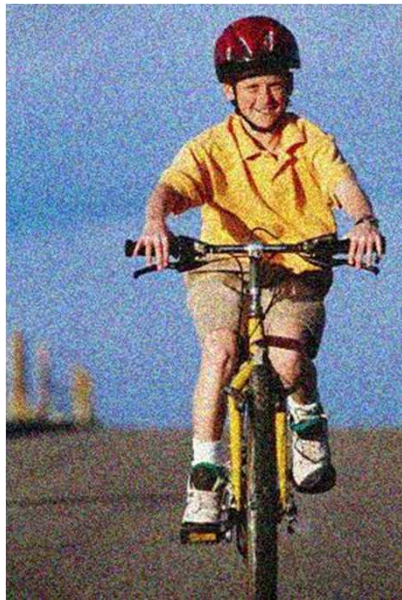
- Cycle facility design needs to:
 - Consider human factors
 - Perceptual and cognitive needs of users
 - Recognize different cycling skills
 - Child / novice
 - Basic competency
 - Experienced

Measuring Success

- Past experience tells us that:
 - If we execute appropriate design
 - Design for all users
 - Recognize varying skills

*...we expect the cycling mode to
grow with success*

Project Goals



Project Goals

- **Goal #1:** Safety assessment process

- **Goal #2:** Carry out this process

- **Goal #3:** Cycle facility selection
 - Research relative safety performance
 - Develop selection criteria
 - On and off-road facilities

Achieving Goal #1

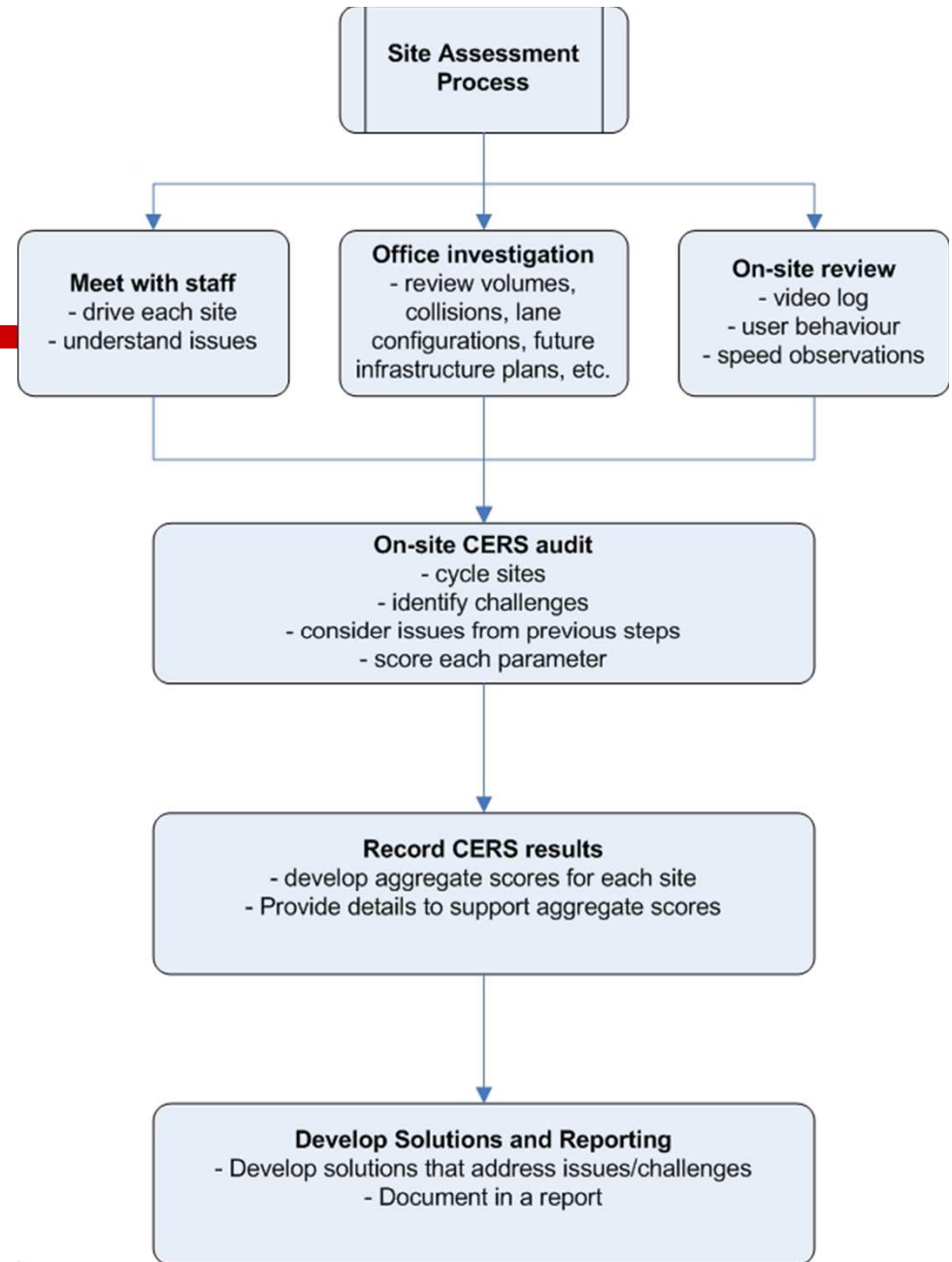


Site Evaluation Methodology

- Requirements:
 - Comprehensive
 - Considers all users (cyclists, drivers, peds)
 - Considers site-specific characteristics
 - Applies a consistent evaluation
 - Generally follows safety audit process

The Process

The site evaluation process:



Achieving Goal #2



Selecting The Sites

- City selected 10 sites

- Selection criteria based on:
 - Collision history
 - Feedback from survey

- 10 sites consisted of
 - 7 roadway segments
 - 3 intersection segments

Where Are The Sites?

Roadways

- Albert/Bronson/Queen (modified)
- O'Connor Street
- Montreal Road
- Bank Street
- St. Patrick Street
- Gladstone/Tyndall/Byron
- Laurier Avenue

Intersections

- Wellington at Lyon
- Maitland Ave at Queensway ramps
- MacKenzie King at Waller

The Assessment Results



On-site CERS Audit (1)

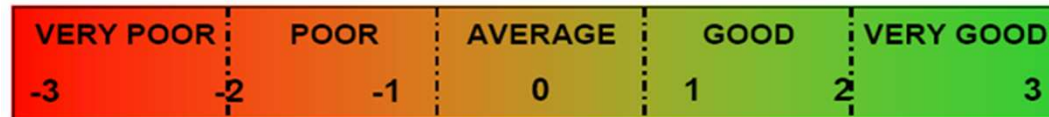
- Applied CERS process
“Cycling Environment Review System”

- Scoring systems for:
 - Roadway segments
 - Intersections

On-site CERS Audit (2)

- Scoring parameters include:
 - Convenience, accessibility/safety, comfort, attractiveness

- Scoring system:



CERS Scoring Results

Intersections:

		Intersections				
		Site #1	Site #3	Site #4a EB	Site #4b WB	Average
Convenience	Cyclist provision	-2	-3	2	-2	-1
	Deviation from the desire line	1	2	2	2	2
	Legibility	-2	-3	2	-3	-2
Accessibility / Safety	Performance	-1	-3	2	-3	-1
	Capacity	-1	-1	1	-2	-1
	Delay	0	2	2	-3	0
	Sightlines	3	-2	2	-2	0
Comfort	Gradient	2	-1	1	-1	0
	Surface quality	1	-3	2	1	0
	Obstructions	2	0	3	-1	1
	Maintenance	1	0	3	1	1

CERS Scoring Results

Road segments:

		Site #2	Site #5	Site #6	Site #7	Site #8	Site #9	Site #10	Average
Convenience	Continuity	2	-2	-3	-1	-3	-3	-2	-2
	Legibility	-1	1	-2	-1	-1	-3	-1	-1
	Directness	-1	2	1	2	1	-3	2	0
Accessibility / Safety	Worst intersection conflict	-1	-3	-3	0	-2	-2	-2	-2
	Traffic volume	0	-3	-3	-3	-3	-3	-3	-3
	Traffic proximity & mix	2	-3	-1	-3	0	0	0	-1
	Traffic speed	2	0	-1	2	-3	0	-1	0
	Link conflicts	0	-3	-3	-3	-3	-2	-2	-2
Comfort	Effective width	1	-3	-2	-3	-3	1	-1	-2
	Surface quality	-2	-2	-2	2	-2	-3	-2	-2
	Maintenance	-1	-2	1	1	1	1	1	0
	Overall effort	-2	3	2	-2	0	3	1	1
Attractiveness	Personal Security	1	-1	0	2	2	2	2	1
	Lighting	2	1	2	2	3	0	0	2
	Quality of the environment	1	-2	-2	1	2	2	1	0

Evaluation Findings

- The safety process allowed us to:
 - Identify systemic issues
 - Identify site specific challenges
 - Confirm the office investigation

Deciding What To Do



The Technical Workshop (1)

- Intent:
 - Address site challenges
 - Develop candidate solutions

- Attended by:
 - MRC, TRL & a CANBIKE instructor

The Technical Workshop (2)

- Information sourced from:
 - Office-based investigation - *characteristics*
 - Field evaluation (CERS) - *risks*
 - Cyclist outreach program – *user input*
- An evidence-based review
- Appropriate solutions identified

Site Solutions

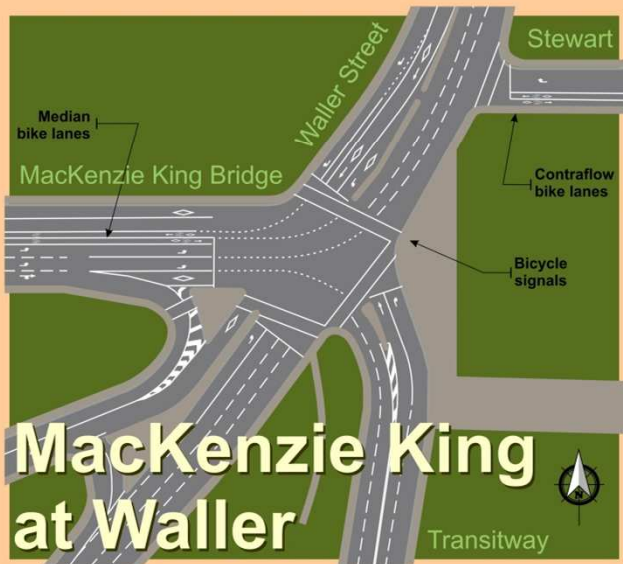
Existing

Observations

- Median cycle lanes (curb lanes reserved for transit - busy Rideau Centre terminal)
- Bicycle signals and advance phases
- Westbound cycle lane markings on Stewart St not currently installed
- High pedestrian volumes – U of Ottawa and Rideau Centre nearby

Challenges

- Getting into median cycle lanes (across bridge)
- High-risk westbound movement from Stewart St to MacKenzie King Bridge
- Many trucks and busses present
- Few appropriate route alternatives



MacKenzie King at Waller

Proposal

Eastbound

- Improve distinction between bicycle signals and traffic signals
- Bicycle phase length extension (to reflect demand)
- Advance bicycle detectors (to minimize delay)
- Improve signage directing cyclists along bike route

Westbound

- Close gap in median (physical barrier) and remove westbound cycle lane between Stewart Street and bridge
- Implement segregated path from Stewart St to MacKenzie King & Waller intersection
- Exclusive bike phase to cross intersection & access cycle lanes on bridge



Achieving Goal #3



The Process

- ❑ Carefully focused literature review
- ❑ Identify safety/comfort criteria
- ❑ Develop facility selection process



The Literature Review

- The state of practice
 - Netherlands
 - United States
 - Australasia
 - Denmark
 - United Kingdom
 - Germany
 - Helsinki



Literature Review Findings

- 3 basic principles:
 - Choice to segregate is not “yes” or “no”
 - Selection criteria need to be flexible
 - Decision requires professional judgment

- These principles were carried forward

The Selection Process

- A 3-step process:
 - Facility pre-selection based on:
 - safety & comfort
 - risk & exposure
 - Establish site characteristics
 - A process to summarize rationale for final decision

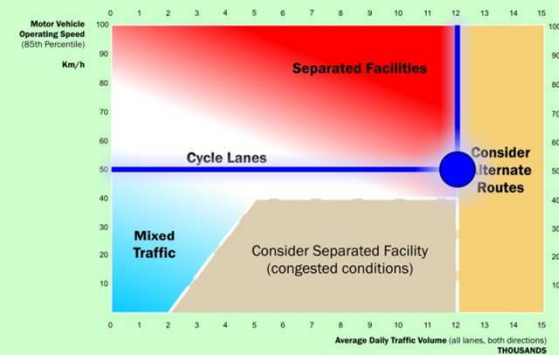
Step 1

Pre-selection Using Nomograph

Step One Pre-select the facility type

Example B: Bank Street
(from Echo Drive to Riverside)

**Cycle Facility
Pre-selection Nomograph**



Traffic volume: 12,000 vpd
Operating speed: 50 km/h

Result: Could be one of three options:
> cycle lanes
> separated facilities
> consider alternate route

Step 2

Site characteristics

Step Two A more detailed look



This view shows the following relevant factors:

Traffic speed: Low (30 to 50 km/h)

Traffic volume: High (> 10,000)

Function: mobility and access

Vehicle Mix: bus stops, buses, trucks

On-street parking: parallel on-street parking; high demand and turnover

Available space: sufficient curb-to-curb width for motorists and cyclists

Anticipated users: experienced cyclists

Level of bicycle use: high >50/hr

Describe Your Site:

The Table in Appendix B has descriptors from the following categories:

- Speed
- Volume
- Function
- Vehicle Mix
- On-street parking
- Intersection/access density
- Collision history
- Available space
- User skill
- User density
- Route function
- Project type
- Costs/funding

Check all that apply.

Select Rules:

From the column next to each checkmark, extract each rule.



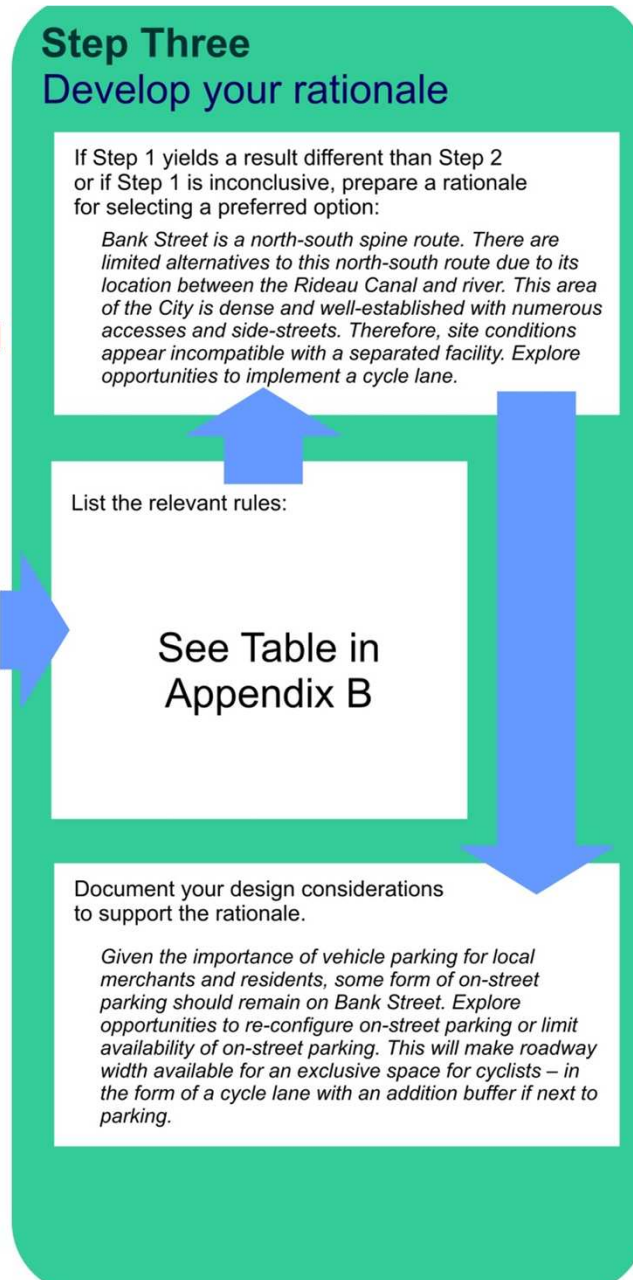
This view shows the following relevant factors:

Function: direct access

Intersection / access density: numerous driveways

Step 3

Decision rationale



Summary of Goal #3

- Technical basis is extensive
- Uses a consistent framework
- Easily deployed
- Allows flexibility for site conditions
- Provides guidance to designers

*...keys to providing a successful
cycling network*

Project Status

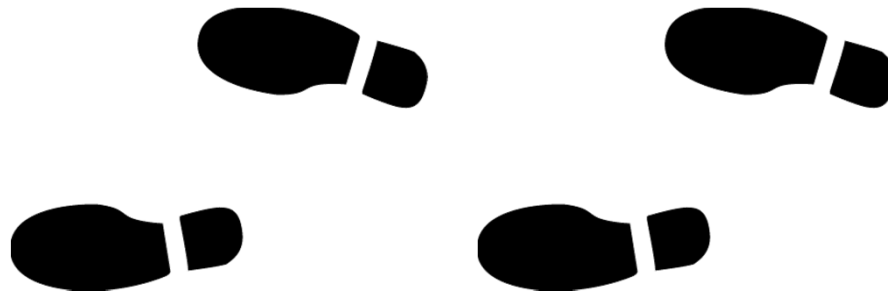


Project Status

- Project goals met
- Draft documentation submitted
- Technology transfer to City:
 - Cycling safety assessment process
 - Foundation for cycling safety toolbox
 - Facility decision support process

Next steps

- Review comments from committee
- Finalize reports & tools
- Ready for deployment decision



Discussion...

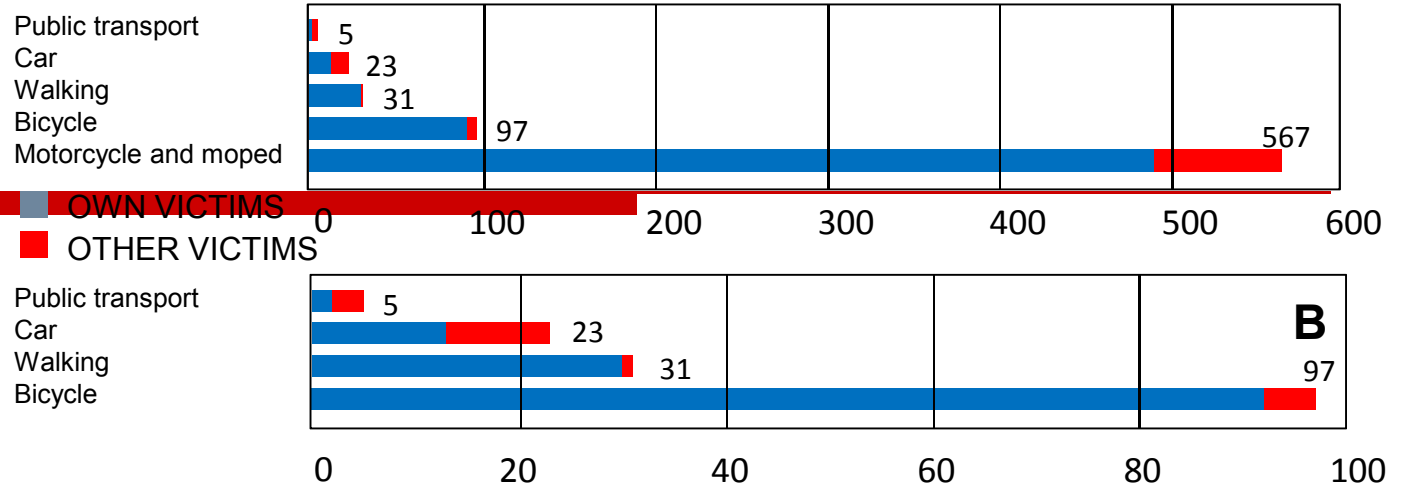




The Helsinki Experience

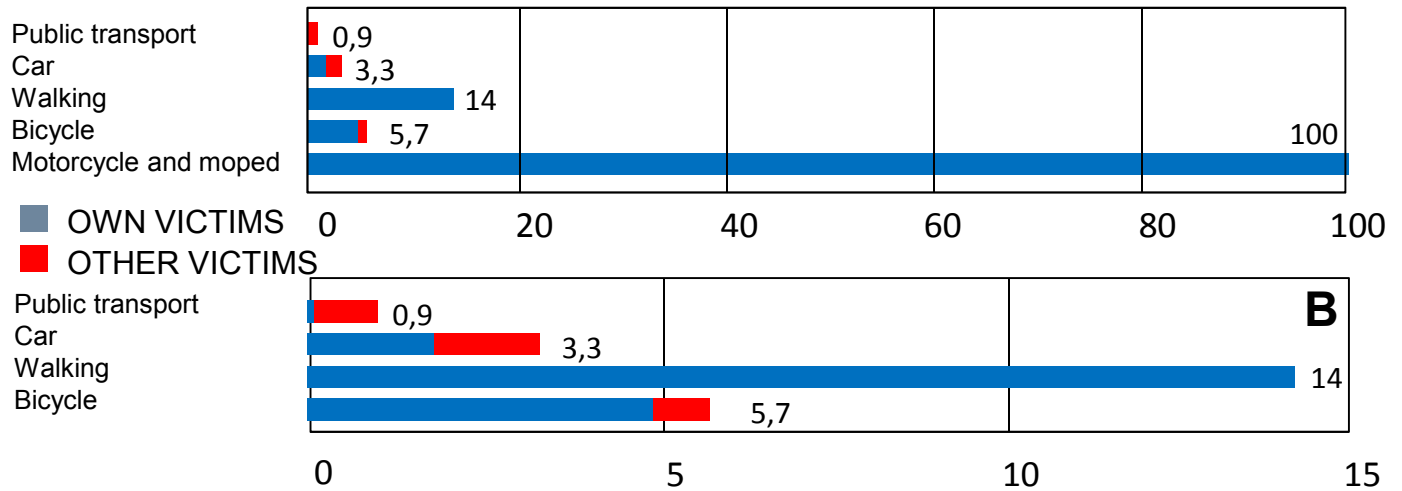
Accident rates in the City of Helsinki

Injured and killed per 100 million person kilometres¹⁾



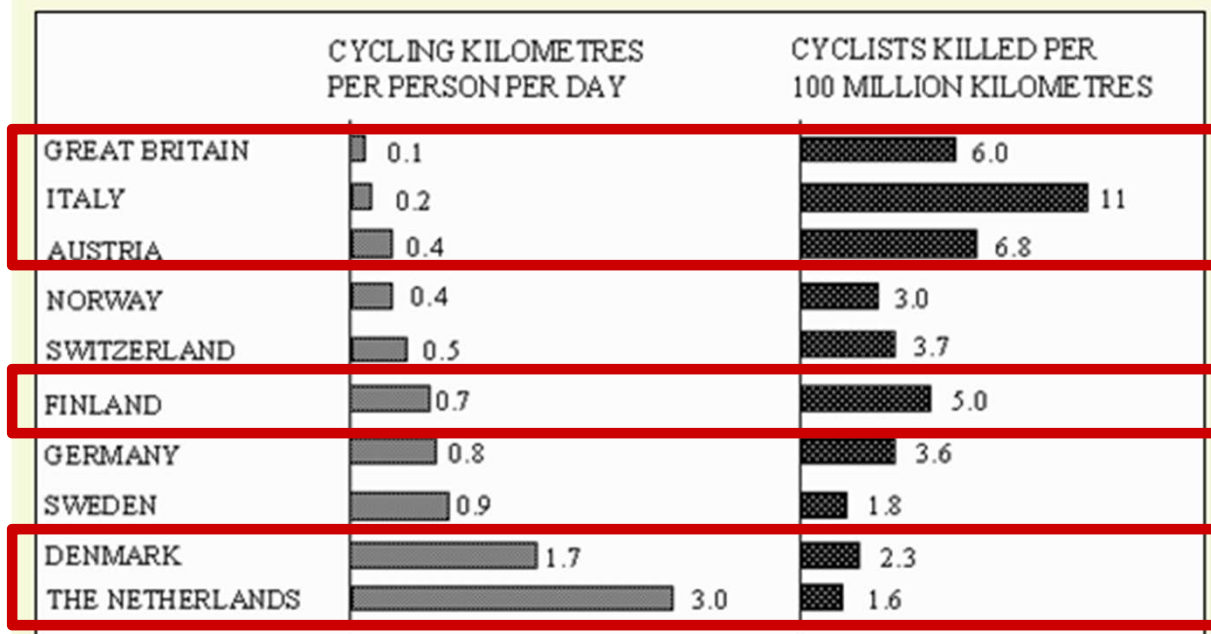
1) Accidents in 2005-2009

Killed per 1 000 million person kilometres²⁾



2) Accidents in 2000-2009

Figure 6: Bicycle mileage per person and cyclist fatalities/100 million km in ten countries [/1/](#).



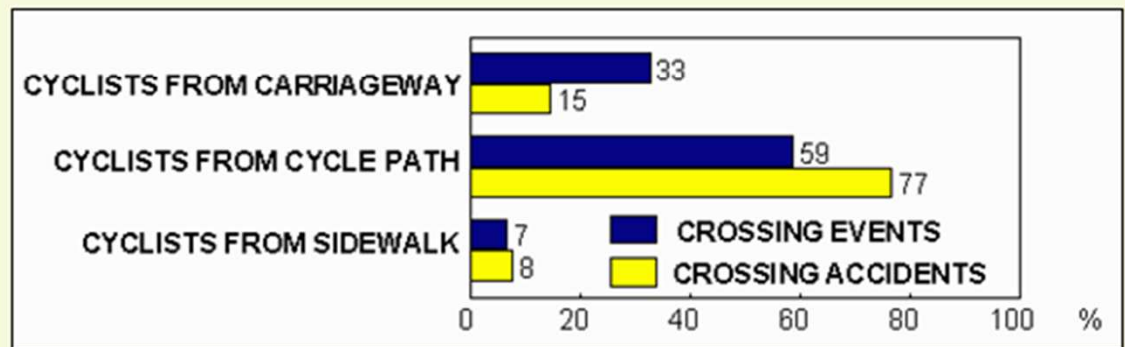
Pasanen E.: Safety problems of pedestrians and cyclists.
 An internal report of the WALCYNG-project. Helsinki
 1997.



Figure 2: Bicycle use and bicycle accidents on different facility types in Helsinki [/5/](#).



Figure 3: Crossing events and crossing accidents for bicycles [/5/](#).



The Workplan

A lines of evidence approach:

