Bicycle lane left of motor vehicle right-turn lane

Denmark
In Denmark, two-thirds of accidents involving cyclists happen at intersections, and many of these accidents happen between right-turning cars and cyclists continuing straight ahead. To improve traffic safety for cyclists, several municipalities and counties have carried out experiments by establishing a bicycle lane between the right-turning lane and the other lanes at intersections with much right-turning traffic. This bicycle lane can be constructed either as a blue lane or as a lane marked by two flattened white lines, in both cases with bicycle symbols. Cyclists should cross the right-turn lane at its beginning.

The idea behind this installation is that conflict between right-turning cars and cyclists going straight ahead will be replaced by a presumably less dangerous weaving conflict before the junction. By letting the cars and cyclists merge before the junction, each will have fewer objects to survey. In addition, cyclists continuing straight ahead will be more visible to oncoming left-turning cars when they meet at the intersection.

A Danish study of bicycle lanes placed between the vehicle right-turn lane and other lanes resulted in few registered accidents involving cyclists related to its construction. Although it is not yet possible to evaluate whether construction affected the total number of accidents, the study does suggest that there is no increase in the number of accidents involving cyclists and right-turning cars at the point where the cycle lane crosses the right-turning lane.

IMPROVEMENTS TO STANDARDIZED FACILITIES

Non-compulsory bicycle lane in cobbled street

Belgium
A component of road infrastructure policy in the city of Brugge is the integration of non-compulsory bicycle lanes into city streets. Non-compulsory lanes function much the same way as standardized lanes; however, no legal consequences exists for motorists who use that part of the roadway.

On Boeveriestraat, a cobbled street within the historic inner town of Brugge, an important link for cyclists was created. In 1995, non-compulsory bicycle lanes made of red, painted asphalt were placed in the street to improve comfort levels for cyclists. City officials cite the positive influence of the lanes on vehicle traffic, reducing speeds by visually narrowing the road surface.

The Belgian Institute for Road Safety recommends a minimum width of 1.5 meters (approximately 5 feet) for non-compulsory cycle lanes.

On other streets, non-compulsory lanes were created to indicate which part of the road is intended for use by cyclists. Similar measures have been implemented in other cities in Belgium (including Gent), and other European countries (including The Netherlands).

Various locations
Other bicycle lane improvements considered innovative in the United States can be widely seen in regular use in other countries. Examples include the use of pigmentation (red and blue), alternate paving materials, staggered bicycle lane elevation (between sidewalk and roadway height) and the use of various roadway barriers to create an exclusive space for cyclists. Although no formal safety evaluations of the following facilities were made available, their widespread use implies routinely successful implementation:

(1) Denmark

Source: Report 106, Road Directorate, Denmark

Picture (1): Elevated bicycle lanes between the roadway and sidewalk are common throughout Europe, and often pigmented. Picture (2): A centerline brick cycle-way makes it more comfortable for cyclists to use a cobblestone street. Picture (3): Rubberized curbs (with reflective strips) and flexible bollards keep the bicycle lane free of automobile traffic. Picture (4): A curb-separated bicycle lane (with blue pigment) creates an exclusive space for cyclists. Separated lanes need to be carefully located to avoid misuse (see p.8). Picture (5): A signed bollard and brick paved bicycle lane channel on-street bicycle and motor vehicle traffic after exiting a bridge. Picture (6): White pavers delineate the path of a contra-flow bicycle lane through a turn. Picture (7): Traffic islands give cyclists a protected and defined space at a turn not permitted for motor vehicles.

(2) Oldenburg, Germany

Source: Department of City Planning, Oldenburg

(3) Champs-Elysees, Paris

(4) Rue St. Germaine, Paris

(5) Utrecht, The Netherlands

Source: Cities Make Room for Cyclists

(6) The Netherlands

Source: Sign up for the Bike (CROW)

(7) Oxford, U.K.

Source: Department of Transport, U.K.

NEW ROADWAY ACCOMMODATIONS

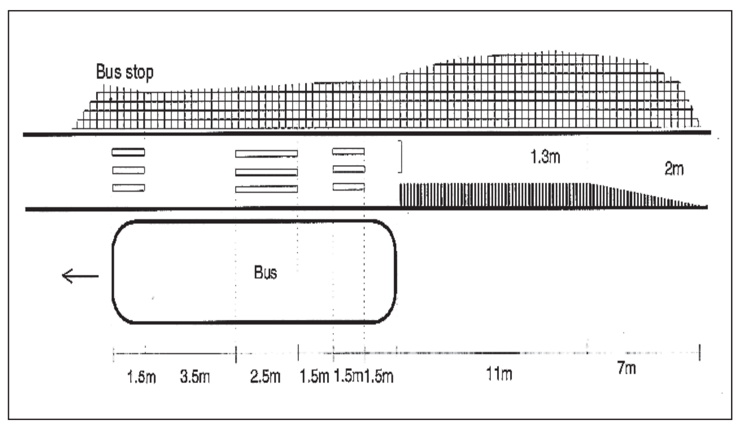
Bus stop redesign (for bicycle/bus lane)

Denmark

In order to reduce the number of conflicts between bus passengers and cyclists at bus stops in urban areas, the Danish Road Directorate has studied three new types of design for bicycle lanes at bus stops which are adjacent to those lanes. These designs differ most notably from bicycle/bus lane design in the United States in their focus on the interaction between cyclists and pedestrian at the stop, rather than the accommodation of free-flow roadway traffic.

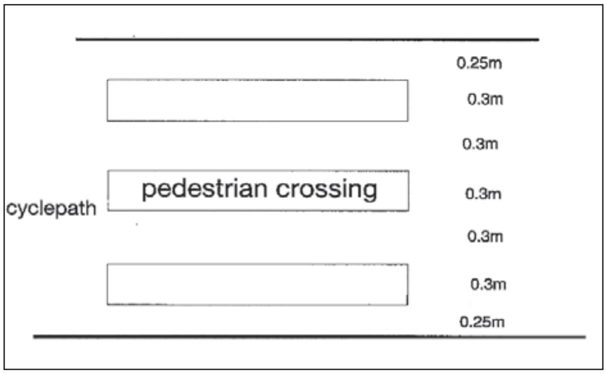
The bus stop designs were created and tested based on the assumption that conflicts between bus passesngers and cyclists could be reduced by making the conflict area visible at bus stops, and if possible, clarifying which party has a right-of-way.

Variation 1: Pedestrian crossing combined with profiled marking



Bus stop redesign (variation 1).
Source: Report 10, Road Directorate, Denmark

The first design consisted of three areas, each of which had three white strips painted across the bicycle lane. These areas resembled pedestrian crossings and were located outside the doors of the bus (the length and location of the strips took into account buses with two or three sets of doors). These areas were implemented in order to increase the attentiveness of cyclists and bus passengers and to guide the alighting passengers across the bicycle lane at right angles. The dimensions of the pedestrian crossings for a 2 meter (6.6 foot) bicycle lane are shown below:

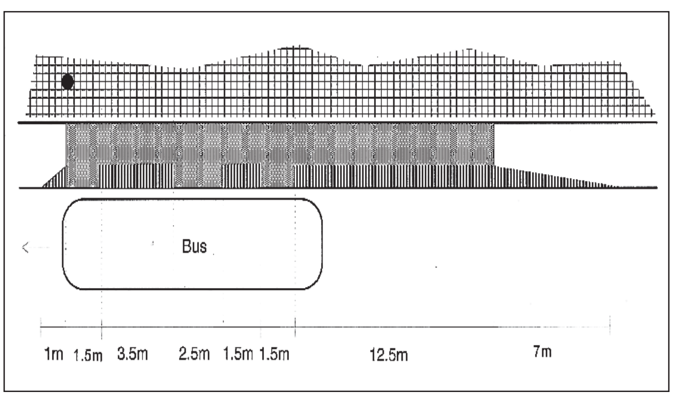


Bus stop redesign (variation 1).
Source: Report 10, Road Directorate, Denmark

A 0.5 meter (1.65 foot) broad profiled marking was also implemented on the offside of the bicycle lane towards the vehicle lane. This profiled marking was implemented on the bicycle path as narrow, lateral strips, with a breadth of 5 cm (2 inches)and a height of 8 mm (0.32 inches) in white thermoplastic material.

(Analysis and evaluation of design variations are given after description of all three).

Variation 2: Profiled marking on offside of cycle area

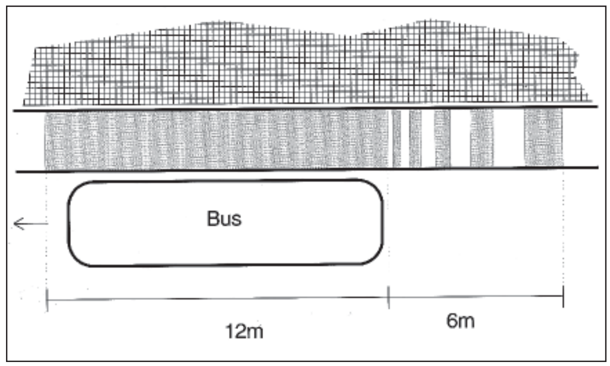


Bus stop redesign (variation 2).
Source: Report 10, Road Directorate, Denmark

This design consisted of a 0.5 meter (1.65 foot) broad profiled strip laid along the offside of the bicycle lane. This strip was implemented in white thermoplastic material, in the form of narrow, lateral strips, with a width of 5 cm (2 inches) and a height of 8 mm (0.32 inches). The rest of the conflict area was painted white.

The profiled strip had the visual effect of reducing the width of the bicycle lane and also caused physical inconvenience when ridden over, to discourage cyclists from doing so. Such a clearly noticeable strip was expected to reduce the speed of cyclists while clarifying the conflict area. Apart from these effects, it also gave alighting bus passengers a small, free area on which to descend.

Variation 3: Painted pattern with visual brake



Bus stop redesign (variation 3).
Source: Report 10, Road Directorate, Denmark

This design consisted of a painted area of the bicycle lane around the bus stop, supplemented with a 6 meter (19.8 foot) warning area. This warning area was comprised of a number of painted areas, the length of which became shorter as cyclists approach the conflict area. It was expected that this would impel cyclists to reduce their speed.

Painting was carried out so that cycling on the strips caused no physical effects, in the form of rumble, while its coefficient of friction was the same as that of the surface of the rest of the bicycle lane. White and yellow colors were tested.

Evaluation of effects:
Overall, it was concluded that the three new designs for cycle areas at bus stops (pedestrian crossing, profiled marking and painted pattern)

brought about a change in behavior expected to increase road safety. There was a tendency for the "pedestrian crossing" design to give better results than the other 2 designs. It was also concluded that:

- all three designs gave a reduction in the average minimum speed of cyclists when there was a bus at the bus stop (between 10% and 42%);
- the new designs increased the distance between the cyclists' reaction point and the nearest conflict point. The number of cyclists that did not react also dropped. Also in this case, the "pedestrian crossing" design gave a slightly better result than the other two designs;
- only designs that included a profiled strip increased the distance between cyclists and passengers alighting from buses. The distance was increased by an average of 0.3 meters (1 foot);
- the proportion of cyclists who waited for bus passengers and allow them to pass first remained unchanged for all three designs;
- the number of serious conflicts dropped significantly at bus stops with painted patterns. The proportion of serious conflicts was very small at the other bus stops both before and after redesign;
- none of the designs necessitated significant modification of bus passengers' behavior.

A re-evaluation of the "profiled strip" and "painted pattern" designs one year after implementation showed that the effects of the new designs remained largely unchanged. Both designs, however, gave a small increase in the number of cyclists who waited for bus passengers and allowed them to pass.

Contra-flow bicycle lane

Belgium (Brugge)

Most Belgian cities allow cyclists to travel in the opposite direction of vehicle traffic on many one-way streets. Brugge, Belgium, for example, has implemented an extended traffic circulation scheme using one-way streets and left turn prohibitions to limit automobile traffic in its inner town. An exception is made for cyclists, however, who can travel both ways on most streets.

One-way traffic for cyclists is less common, and used only when a nearby parallel street provides a sufficient and practical alternative. Approximately 50 streets have been converted from one-way into bi-directional streets for cyclists. The number of cyclists in the city of Brugge has increased 21% after the introduction of the new traffic scheme. To date, no negative safety effects have been noted.

The Belgian Institute for Road Safety provides several recommendations for the introduction of bi-directional use of one-way streets. Overall, the minimum width of the main carriage way should be:

- 3.5 meters (11.5 feet) if lorries (trucks and service vehicles) are expected in the street;
- 3 meters (10 feet) if car traffic volume is low and almost no lorries are expected.

In streets with much and/or fast car traffic an exclusive bicycle lane is recommended. Special attention should be paid to possible conflicts between parking cars and cyclists moving in the opposite direction. Cars parked on the left side of the street (facing cyclists in the opposite direction) should be avoided under certain conditions. Specific traffic signing has been created for bi-directional use of one-way streets in Brugge. Small refuges (traffic islands) are also recommended to prevent cars from making sharp turns.

Other road layout elements are recommended to draw attention to the possible presence of cyclists at road junctions, including continuous colored (red) bicycle lanes. Frequent repetition of a cyclist road pavement marking symbol is recommended to remind both car drivers and crossing pedestrians of the presence of cyclists in the opposite direction.

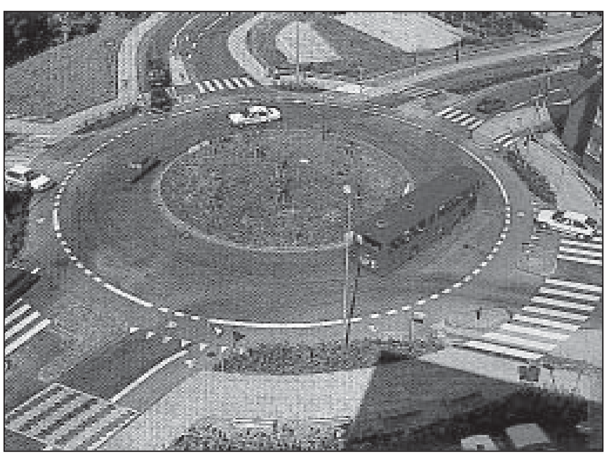
The Netherlands (Utrecht)

Due to the increasing conversion of two to one-way streets in urban areas and town centers, many Dutch cities allow cyclists to use one-way streets in both directions to create direct route access and avoid detours. One-way streets in Utrecht are divided up into "partial one-way streets with a tight profile," and "partial one-way streets with a spacious profile" (see "***Traffic calming techiques***" for profile descriptions).

Partial one-way traffic with a tight profile:
Motor vehicles have to remain behind cyclists; a bicycle lane in the oncoming direction can help promote this. With a roadway width of about 3.85 meters (12.7 feet), approximately 2.25 meters (7.4 feet) should be allocated for joint motor vehicle and cyclist use; approximately 1.5 meters (5 feet) should be allocated for a single bicycle lane in the other direction. An alternative with a deterrent strip and adjacent parking strip is also used. The design speed for motorized traffic should not be more than 30 km/h. This tight profile is not recommended if a greater part of the motorized traffic consists of heavy goods vehicles.

Partial one-way traffic and spacious profile:
A car and cyclist in one direction and a cyclist in the other can simultaneously encounter/overtake, with a recommended total roadway width of 5.5 meters (18 feet). A minimum roadway width of 6.3 meters (21 feet) is needed if a greater part of the motorized traffic consists of heavy goods vehicles. A speed level of 30 km/h is required.

Roundabout design



A roundabout with pigmented (red) cycle lanes. Source: Report 106, Road Directorate, Denmark

United Kingdom (U.K.)
In *Cycle-Friendly Infrastructure: Guidelines for Planning and Design* (1996), the U.K. Department of Transport makes recommendations for roundabout design based on past studies and implementation efforts. The guide cites that cyclists are often 14 to 16 times more likely than car users to suffer an accident at a roundabout. More than 50% of these accidents are due to motorists entering the roundabout and hitting cyclists circulating within the right-of-way.

Small roundbouts with flared entries and large roundbouts which allow high speeds were found to be particularly hazardous for cyclists. Mini, conventional and signalized roundabouts presented fewer problems. In one study, accidents to cyclists were reduced by 66% on roundabouts with full-time signals on all or some arms. Part-time signals, however, produced no significant change. In addition, segregated (dedicated) left turns lanes, unless controlled by signals, were found to be inherently unsafe for cyclists.

To make roundabouts safer for cyclists, the Department of Transport recommends reduced circulatory roadway widths, use of advanced stop lines at signals, increased deflection on entry and improved signage and road markings. Three basic traffic layouts are recommended: mixed traffic (motor vehicles and cyclists), a physically-segregated cycle lane with cyclist priority, and free-standing cycle paths with cyclist priority.

The mixed traffic layout, in particular, is based on an external diameter of 24 to 32 meters (approximately 79 to 106 feet), low entry speeds, a narrow circulatory roadway that prevents motor vehicles from overtaking cyclists on the roundabout and single lane entry arms. The Department of Transport is careful to note that high volumes of cyclists in the U.K. may account for drivers accepting cyclist priority layouts.

Denmark
In Nakskov, a two-lane roundabout situated on the outskirts of a 1.3 km bicycle route in Nakskov was specifically redesigned to accommodate cyclists in 1991. The bicycle area of the roundabout was marked with a red asphalt coating. In addition, a row of paving stones and white painted border lines were installed to separate

cyclists from motor vehicles. At each entry the bicycle lane was divided by paving stone islands, each shaped like a banana. Ramps of paving stone were constructed at each entry point, to help reduce the speed of cars and bring attention to crossing pedestrians and cyclists.

Roundabout with pigmented cycle lanes in Nakskov. Source: Report 106, Road Directorate, Denmark

Danish behavioral studies show that road users typically use roundabouts as intended. Of the conflicts that do occur, however, many involve cyclists who use the roundabout in a wrong way (e.g. riding in the wrong direction). Although the installation of roundabouts does not reduce the number of personal injury accidents involving cyclists, they do reduce the seriousness of the accidents.

This is also the case for the Nakskov installation. In addition, it has been shown that cyclists, as a result of the special construction of the stone islands, do not show hand signals when they turn from the circulation areas to the exits. The stone islands do, however, make it easier for motorists to see at an early stage whether cyclists intend to turn or not.

Traffic-calming techniques

Traffic calming techniques widely used in Europe often focus on the use of "shared streets," incorporating pedestrians, cyclists and motor vehicles. From among many traffic calming examples and studies, only those that specifically addressed provisions for cyclists are discussed here.

United Kingdom (U.K.)

In 1997, the Transport Research Library published a study (commissioned by the Department of Transport) examining the safety and convenience of cyclists at road narrowings created by three traffic-calming installations: central islands, chicanes and pinch points (mirrored chicanes). The study used (1) information from local highway authorities and cyclists' organizations, (2) detailed site reconnaissance of 28 road narrowing schemes, (3) filming of 15 selected sites to obtain data on cyclist and driver maneovers and (4) attitude surveys with cyclists carried out at three sites in London and Oxford.

Safety: Accidents for all vehicles and accidents involving cyclists either fell or stayed the same after installation of the road narrowings. Overall, accidents involving cyclists fell from an average of 1.51 accidents per year to an average of 0.96 accidents per year. However, this was not statistically significant and changes in cycle flows were not available.

Driver behavior: At central island sites with lane widths between 3.5 and 4.2 meters (11.5 and 14 feet), less than 15% of drivers waited behind cyclists. At the pinch point sites, motor vehicles were more likely to wait behind cyclists, probably due to oncoming vehicles, lower speeds, and lower traffic flows. Motor vehicle encroachment into cycle lanes was high at sites with a residual lane width for motor vehicles of less than 3 meters (9.9 feet).

Cyclist behavior: Where a cycle bypass was provided, most cyclists used it, particularly when the bypass was long and straight. Where a cycle lane was marked, most cyclists stayed within the lane. Cycle bypass and cycle lane use was higher at sites with higher traffic volumes. At sites where no specific facility for cyclists was provided, most cyclists said that they took extra care or rode "defensively." A minority kept their line speed or moved out towards the middle of the roadway when cycling through the scheme.

From interviews, cyclists' opinions of the narrowings varied according to the details of individual site layouts. In general, they tended to dislike narrowings, but, overall, felt that cycling conditions had improved due to better traffic behavior. This finding is most likely attributable to feelings of anxiety and nervousness expressed by cyclists at road narrowings, even if they did not feel that accidents were more likely to occur. The report speculates that reasons for this anxiety may include uncertainty about driver behavior, the reduced distance between cyclists and overtaking vehicles, and situations where drivers are forced to slow and wait behind cyclists.

Recommendations: Recommendations of the Transport Research Library based on the results of its study are cited below:

- In the context of promoting cycling as a means of transport, road narrowings that increase the perception of danger amongst cyclists, even if they do not result in increased cyclists casualties, should be avoided;
- Adequate width (4.5 meters; 15 feet) for motor vehicles to overtake cyclists, or cycle bypasses, should be provided at road narrowings, particularly at sites with high motor vehicle flows, significant numbers of large vehicles, or vehicle speeds above 30 mph;
- Where bypasses or adequate width cannot by provided due to site constraints, speed reducing measures in advance of the narrowing should be considered;
- Attention to scheme design, drainage arrangements; maintenance and parking enforcement can reduce or prevent problems of obstruction;
- It could be stipulated in the Highway Code that motor vehicles should not overtake cyclists within, say, 20 meters (66 feet) of a road narrowing;

The Netherlands (Utrecht)

"Cycle streets" implemented in Utrecht allow mixed traffic where cyclists have a dominant position and motorized traffic is allowed (but should not be dominant). With regard to roadway dimensions, a distinction is made between a (1) spacious profile, (2) critical profile and (3) tight profile.

With a spacious profile there is enough room for motorists to overtake cyclists. As a result, this profile risks higher (and therefore dangerous) vehicle speeds. It is not recommended by city officials.

A critical profile lies in between a spacious and tight profile, leaving just enough room for motorists to overtake cyclists closely. As with a spacious profile, this can lead to dangerous situations for cyclists and a higher speed for motorized traffic. As a result, this profile is also not recommended from a point of view of safety for cyclists.

A tight profile does not provide enough space for overtaking maneuvers. Motorists that wish to overtake cyclists have to wait until cyclists offer the space to overtake. Although this type of street design leads to lower driving speeds, cyclists can feel pressed or threatened by motor vehicles wishing to overtake them. This design is recommended only for streets with low volumes of motorized traffic and with relatively short road sections. Speeds should not be higher than 30 km/h.

Denmark (Aalborg)

"Combi-hump" traffic-calming design.
Source: Report 106, Road Directorate, Denmark

A combined traffic-calming installation was designed in Aalborg for easy use by both cyclists and buses. A path at the right-side of the roadway easily allows bicycles to pass the site without disruption. “Combi-humps” installed in the center of the motor vehicle roadway force cars to pass a cobbled and fairly steep hump, but contain two less-steep asphalt humps designed for the track gauge of buses. The humps were marked by 30km/h road signs and were indicated by bollards as well.

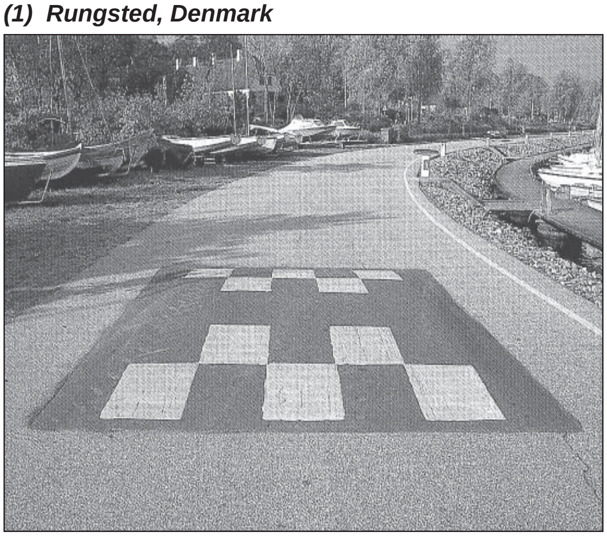
Most drivers chose to cross with a wheel on one of the asphalt lanes, but this did not change the speed reducing effect: cars crossed the hump at an average speed of 25 km/h, and the mean speed of heavy vehicles was 20 km/h.

Various locations

Although no formal evaluations were received about the following installations, they are depicted below to illustrate a conscientious incorporation of cyclists into overall traffic-calming schemes:

Picture (1): Dome-shaped humps (with hatch marking) cover only the center of the roadway, allowing space on either side for cyclists to pass unimpeded. Picture (2): Traffic-calming scheme with road narrowing and trapezoidal hump gives cyclists an exclusive and protected right-of-way. Picture (3): A cobbled-strip slows cars at an intersection but does not obstruct a pigmented cycle lane. Picture (4): A smoothly paved track channels cyclists in a pedestrian-only street.

(1) Rungsted, Denmark



Source: Report 106, Road Directorate, Denmark

(2) Birkerod, Denmark

Source: Report 106, Road Directorate, Denmark

(3) Nakskov, Denmark

Source: Cities Make Room for Cyclists

(4) Oldenburg, Germany

Source: Department of City Planning, Oldenburg

APPENDIX F:
Recessed Motor Vehicle Stop Line Study:

Calculation of consequences of traffic lights' timing sequence at junctions controlled by traffic lights, where the vehicle stop line is recessed by 5 m

Conditions:

1) Existing stop lines located 0.5 m from pedestrian crossing

2) New stop lines implemented 5.5 m from pedestrian crossing

3) Guide lines of road rules on traffic lights for calculation of intervals. It is assumed here that the last cyclist passes the stop line 2 seconds into the amber period and the last vehicle, 3 seconds into the amber period. The cycle is assumed to be 2 m long and the vehicle, 8 m.

Calculation for a 20*20 m junction

a) Latest cyclist and earliest vehicle (Fig. a).

Interval between existing stop line (0.5 m from pedestrian crossing)

time taken by latest cyclist to pass the junction:

t1 = (21 + 2 m)/(5 m/sec) = 4.6 seconds

time taken by earliest vehicle to enter the junction:

t2 = (5 m)/(13 m/sec) = 0.4 seconds

Minimum interval: T = t1-t2+2 sec = 6.2 seconds

Interval with new stop line (5.5 m from pedestrian crossing)

time taken by latest cyclist to pass the junction:

t1 = (21+2 m)/(5 m/sec) = 4.6 seconds

time taken by earliest vehicle to enter the junction:

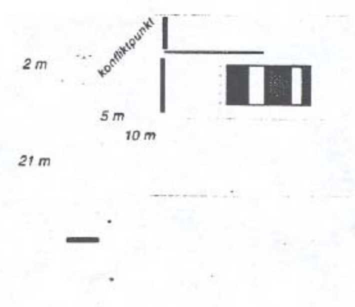


Figure a. Latest cyclist and earliest vehicle.

$t2 = (10\ m)/(13\ m/sec) = 0.8$ seconds

Minimum interval: $T = t1 - t2 + 2$ sec $= 5.8$ seconds

Thus, the new stop line requires a 0.4 second shorter interval than the existing stop line.

b) Latest vehicle and earliest cyclist (Fig. b).

Interval with existing stop line (0.5 m from pedestrian crossing)

time taken by latest vehicle to pass the junction:

$t1 = (23+8\ m)/(13\ m/sec) = 2.4$ seconds

time taken by earliest cyclist to enter the junction:

$t2 = (7\ m)/(8\ m/sec) = 0.9$ seconds

Minimum interval: $T = t1 - t2 + 3$ sec $= 4.5$ seconds

Figure b. Latest vehicle and earliest cyclist.

Interval with new stop line (5.5 m from pedestrian crossing)

time taken by latest vehicle to pass the junction:

$t1 = (28+8\ m)/(13\ m/sec) = 2.8$ sec

time taken by earliest cyclist to enter the junction:

$t2 = (7\ m)/(8\ m/sec) = 0.9$ seconds

Minimum interval: $T = t1 - t2 + 3$ sec $= 4.9$ seconds

Thus, the new stop line requires a 0.4-second longer interval than the existing stop line.

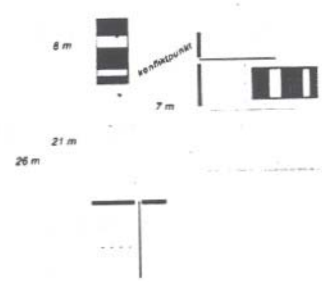


Figure c. Latest vehicle and earliest vehicle.

c) Latest vehicle and earliest vehicle (Fig. c).

Interval with existing stop line (0.5 m from pedestrian crossing) time taken by latest vehicle to pass the junction:

t1 = (21+8 m)/(13 m/sec) = 2.2 seconds

time taken by earliest vehicle to enter the junction:

t2 = (7 m)/(13 m/sec) = 0.5 seconds

Minimum interval: T = t1-t2+3 sec = 4.7 seconds

Interval with new stop line (5.5 m from pedestrian crossing)

time taken by latest vehicle to pass the junction:

t1 = (26+8 m)/(13 m/sec) = 2.6 seconds

time taken by earliest vehicle to enter the junction:

t2 = (12 m)/(13 m/sec) = 0.9 seconds

Minimum interval: T = t1-t2+ 3 sec = 4.7 seconds

Thus, the new stop line requires the same interval as the existing stop line.

Overall, however, it is Case a), latest cyclist earliest vehicle, that determines the dimensions. In this calculation, therefore, recessing the stop line has no influence on the dimensioning minimum interval.

Source: Kenneth Kjemtrup, Secretariat of Road Standards, Road Directorate.

APPENDIX G:
Interviews with State and Local Bicycle Coordinators:

Dave Bachman, PENNDOT Bicycle and Pedestrian Program Coordinator. PENNDOT Bureau of Highway Safety and Traffic Engineering, P.O. Box 2047, Harrisburg, PA 17105-2047. (5/27/98)

Mia Birk, City of Portland Bicycle Program Manager. Bureau of Traffic Management, 1120 S.W. 5th Avenue, Room 730, Portland, OR 97204. (5/21/98)

Diane Bishop, City of Eugene Bicycle Coordinator. Public Works Department, 858 Pearl Street, Suite 300, Eugene, OR 97401. (6/1/98)

Tom Branigan, City of Philadelphia Bicycle Coordinator. 1401 JFK Blvd., Room 830, Philadelphia, PA 19102-1676. (6/1/98)

Tim Bustos, City of Davis Public Works Department. 23 Russell Boulevard, Davis, CA 95616. (5/20/98)

Charles Cadenhead, Jr., Minnesota State Bicycle Coordinator. Office of Advanced Transportation Systems, Mail Stop 315, 10th Floor Kelly Inn, 395 John Ireland Blvd., St. Paul, MN 55155-1899. (5/29/98)

Ben Gomberg, City of Chicago Bicycle Program Manager. Chicago Department of Transportation, Room 400, 30 N. LaSalle, Chicago, IL 60602. (5/20/98)

Adam Gubser, City of San Francisco Bicycle Program. San Francisco Department of Parking and Traffic, 25 Van Ness Avenue, #345, San Francisco, CA 94102-6033. (6/1/98)

Karel Hanson, County of San Diego Bicycle Coordinator. Department of Public Works, County Operations Center, 5555 Overland Avenue, San Diego, CA 92123-1295. (5/98)

William W. Hunter, Associate Director, Engineering Studies, Highway Safety Research Center, University of North Carolina, CB #3430, 730 Airport Road, Chapel Hill, NC 27599-3430. email: bill_hunter@unc.edu (6/98)

Kimble Koch, The Presidio Project, National Park Service, San Francisco, CA. (6/4/98)

Peter Lagerwey, City of Seattle Bicycle and Pedestrian Coordinator. Seattle Engineering Department, 600 Fourth Avenue, Suite 708, Seattle, WA 98104-1879. (6/1/98)

Theo Petritsch, Florida State Pedestrian and Bicycle Coordinator. Florida DOT, 605 Suwannee Street, Tallahassee, FL 32399-0450. (5/98)

Michael Ronkin, Oregon State Bicycle and Pedestrian Program Manager. Oregon DOT, Transportation Building, Room 210, Salem, OR 97310. (5/20/98)

Arthur Ross, City of Madison Bicycle and Pedestrian Coordinator. Madison DOT, 215 Martin Luther King Jr. Blvd., P.O. Box 2986, Madison, WI 53701. (6/3/98)

Cara Seiderman, City of Cambridge Bicycle and Pedestrian Coordinator. 57 Inman Street, Cambridge, MA 02139. (6/11/98)

Keith Walzak, City of Tucson Alternate Modes Coordinator. City of Tucson DOT, 201 N. Stone Avenue, 6th Floor, Tucson, AZ 85701. (6/4/98)

Katherine Watkins, City of Cambrige Traffic Calming Project Manager. Community Development Department, 57 Inman Street, Cambridge, MA 02139. (6/4/98)

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www.lelport.com/~bta4bike

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www.detr.gov.uk/dot/ncs/strategy.htm

City Eugene, OR:
www.ci.eugene.or.us

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www.cycling.org
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www.bts.gov/NTL/DOCS/mapc.html

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cycling: *www.bikelane.com*

cycling: *www.bikeplan.com*

Manufacturer Listings for Bicycle Facility Test Materials:

(note: This list constitutes a partial source of information. Additional manufactuers are available which are not listed here).

profiled markings (textured striping)

Agomer GmbH
Postfach 13 45
D-63403 Hanau
Germany
Tel: 06181 59-3252
Fax: 06181 59-2995

3M
Traffic Control Materials Division
25 Van Nostrand Avenue
Roslyn Heights, NY 11577
Tel: 800.736.2725

3M Center, Building 225-5S-08
P.O. Box 33225
St. Paul, MN 55133-3225
Tel: 612.733.1110

The RainLine Corporation
"Rainline with a Bump"
P.O. Box 210818
Montgomery, AL 36121-0818
Tel: 334.277.0237

Stimsonite Corporation
"AquaLite"
7542 North Natchez Avenue
Niles, IL 60714
Tel: 800.327.5917

Briteline
"VibraLine"
104 Revere Street
Canton, MA 02021-2996
Tel: 888.201.6448

raised curbs/reboundable delineators

Qwick Kurb, Inc.
"Qwick Kurb" (curb)
"L120 Stubby" (flexible bollard)
"L125 Thin Sister" (flexible bollard)
"L94 Flat Delineator" (flexible panel)
"L104 Air Panel" (flexible panel)

2818 Parkway Street
Lakeland, FL 33811
Tel: 800.324.8734

Atelier Parisien d'Urbansime
(contact for manufacturer reference)
17 Bd Morland
75004 Paris, France
Fax: 33.1. 42.76.24.05

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