

INFRASTRUCTURE/ **NETWORK LINKS****CONTRA-FLOW CYCLING****Overview**

Contra-flow cycling is when cyclists are allowed to ride against the flow of one-way streets. This is a simple regulatory measure and highly attractive for cyclists. It creates shortcuts away from busier traffic. It has proven to be safe, even in the narrowest streets, when speeds are low and traffic quiet. Contra-flow cycling should be generalized city-wide: this way, they become a normal situation for all and cyclists benefit most.

**Background and Objectives***Function*

Contra-flow cycling in one-way streets offers cyclists on-street shortcut links not available to motorized traffic. This mostly allows them to avoid heavy-traffic roads.<sup>1</sup>

*Scope*

In many urban areas, streets restricted to **one-way traffic** are common<sup>2</sup>. They are used as a tool to organize motorized traffic flow in the following situations.

- Streets in the oldest central parts are often too narrow for two-way motorized traffic, and car access needs to be maintained.
- If on-street parking demand is high, one-way traffic is a way of creating extra parking space. This happens when streets are just wide enough for two-way traffic but lack space for a parking lane (or a second parking lane).
- Entire areas, most often residential neighborhoods, are organized as one-way traffic systems, often in loops that force cars to enter and leave on the same side of the area. The one-way streets maintain local car access, but prevent rat-running and force through-traffic onto arterial roads.
- One-way traffic systems may also be introduced to speed up traffic flows, which is more common in the street-grid structure (especially in the USA).

However, large numbers of one-way streets have a **strongly negative impact on cycling**. Cyclists suffer more strongly from the restrictive effect than by motorists.

- Detours are more strongly felt, relative to cyclists' shorter trip distances.
- Cyclists need to expend extra energy to drive the extra distance. In hilly regions, the detour may impose stronger gradients.
- Cyclists are forced out of mostly safe, narrow and attractive streets onto much busier, riskier and noisier arterial roads and intersections.
- Cyclists need to plan their trips more carefully, since routes are not the same in both directions of a two-way journey.

All in all, frequent one-way streets **strongly reduce the quality of the cycling network**, which becomes less cohesive, less direct, less comfortable, less safe and overall less attractive. They risk to discourage cycling, or to incite cyclists to drive illegally against the flow.

<sup>1</sup> Additional sources for this fact sheet : IBSR 2004 - *SUL - Sens Uniques Limités. Pour une introduction généralisée, en toute sécurité, des sens uniques limités* ; Provélo 1997 - *Les sens uniques limités à Bruxelles; TAL6/98 Contraflow Cycling*, DfT 1998; CERTU, 2008 - *Recommandations pour les aménagements cyclables*.

<sup>2</sup> In Brussels, for instance, there are 700 km of one-way streets. (source: Pro-vélo)



It is therefore strongly **recommended to exempt cyclists from one-way restrictions as a general principle**. This is nearly always possible, as long as there is sufficient room to allow a car and a cyclist to cross safely.

Contra-flow cycling is most often applied on basic cycle network links in low-speed local access roads, both within and outside the built-up area. It can, however, also be applied on major links and on busier and faster roads, but this requires suitable design solutions to ensure safety, ranging from cycle lanes to cycle tracks.

## Implementation

### Definition

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Contra-flow cycling is a regulatory measure. In streets and roads with a one-way traffic restriction, cyclists are exempt from the one-way restriction and are allowed to drive against the flow of motorized traffic.

### Unsafe? On the contrary!

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At first sight, contra-flow cycling looks risky. Over the years, however, experiences in various cities and countries have been consistently positive and have proven the **overall safety gains** of contra-flow cycling. Nowhere has contra-flow cycling led to a rise in accidents, on the contrary. In many cities where contra-flow cycling was tried, road managers and police started with very stringent safety criteria, but they mostly relaxed them as time went by.

Contra-flow cycling has proven to be particularly **safe along road sections**, even safer than cycling with the flow in one-way streets.

- The cyclist and the motorist have visual contact. Both estimate the ease with which they can cross, both slow down and adapt their behavior.
- When cycling with the flow, only the motorist makes such judgments, and the cyclist cannot see or predict what the car coming from behind will do. In general, overtaking cars are an important cause of cycling accidents.

In addition, we should take into account the risk avoided because cyclists are no longer using other, more hazardous routes.

Nevertheless, as traffic increases (cars, cyclists or both) the number of encounters rises as well: this may lead to irritation and more careless behavior.

**Intersections are potentially more dangerous.** Analysis of accidents has shown that a dangerous situation occurs through a combination of three factors.

- Cyclists have the right of way, emerging in contra-flow direction from a one-way street.
- The paths of a cyclist and car intersect.
- Drivers do not give right of way to cyclists, out of ignorance or inattention.

The safety hazard of each intersection should be carefully assessed, but in most cases proper signage and markings will suffice to establish objective security. Stronger options may be considered to increase subjective security (see below).

A key issue is that motorists need to become aware of contra-flow cycling and the rights of cyclists. They need to be prepared for cyclists emerging from unexpected directions.

The best way to increase safety and to create maximum benefits for the cyclist is to **generalize the principle of contra-flow cycling in all one-way streets**.

- If contra-flow cycling is introduced **piecemeal**, in a limited number of dispersed one-way streets, the situation remains **unpredictable**. Cyclists need to remember where contra-flow cycling is allowed or not or consult cycling maps. They may also be incited to ride against the flow where it is not allowed. Since contra-flow cycling remains exceptional, motorists will continue to be surprised or even irritated at what they may feel is irresponsible and illegal cyclist behavior. More costly infrastructure may be needed to assure safety.

- If contra-flow cycling is **generally applied**, the situation is more **predictable**, easy to grasp and safer for all road-users. Cyclists can stop worrying: they now know that any route they like to take will be open to them. And motorists will more quickly grasp the principle and become more aware of potential cyclists in any street and on any intersection.

### Signage

Contra-flow cycling is a regulatory measure, which can be implemented simply by using proper **signage**. This varies among countries, but the basic principles are similar.

- The most common solution is an **additional sign exempting cyclists** from the one-way restriction. This sign usually mentions "except" with a bicycle symbol. It is added below the mandatory no-entry sign and the exit sign indicating one-way flow with an arrow.
- On the entry signs of the one-way street, in some countries it is possible to use an **arrow with a bicycle symbol**, to indicate a flow only allowed for cyclists.
- In some countries, notably the UK, cyclists cannot be exempt from no-entry signs. However, contra-flow cycling is possible by using a **mandatory contra-flow cycle lane**, physically segregated at the entry.
- **Normal right-of-way rules** apply, also for the cyclist. Specific signage for the cyclist leaving the one-way street is recommended, such as a stop sign and markings, as well as a specific traffic signaled on signaled intersections.<sup>3</sup>



Contra-flow cycling exit sign, Brussels, BE



Contra-flow cycling entry sign, Rennes, FR

### Lay-out options

Contra-flow cycling can be implemented as mixed traffic or with a cycle lane.

- In most cases, contra-flow cycling can be organized without any special provision as **mixed traffic**. This is possible at low speeds, up to 30 km/h actual speed in the built-up area. In narrow city streets, this may correspond to a speed limit of 50 km/h, since cars will slow down when crossing a cyclist. Additional calming measures may be needed<sup>4</sup>. Outside the built-up area, contra-flow cycling can be considered up to 60 km/h.
- **Contra-flow cycle lanes** are recommended when actual speeds are over 30 km/h inside the built-up area (or 60 km/h outside the built-up area). At any speed, cycle lanes are recommended when traffic intensities are higher. A parking lane may be taken out to make room for the cycling lane. Contra-flow cycling lanes should be designed as any cycle lane, with a recommended width of 1.5 m<sup>5</sup>. In practice, many cities reduce this width, to 1.2 m or even 0.9 m in narrow streets: on the one hand space is often not available; on the other hand contra-flow cycling slows traffic down.<sup>6</sup>

<sup>3</sup> In Zürich, the principle was adopted that the contra-flow cyclist loses right-of-way. If experience and empirical evidence had shown a real risk, this example would have been widely followed. It has not.

<sup>4</sup> See fact sheet TRAFFIC CALMING

<sup>5</sup> See fact sheet CYCLE LANES

<sup>6</sup> Alternatively, cyclists can be allowed to use a contra-flow bus lane. See fact sheet CYCLING ON BUS LANES



Contra-flow cycling with advisory lane or cycle lane, in narrow and wide one-way streets (image source: D. Dufour, P. Kroeze)

### Required road width

Contra-flow cycling is applied on **available carriageway widths from 3 m upwards**, sometimes even as low as 2.6 m. Guidelines, however, differ markedly between CHAMPION CYCLING CITIES and STARTER CYCLING CITIES.

- **Champion cycling cities** tend to set exceptionally high **total quality standards** for contra-flow cycling. These ambitious criteria correspond to their long tradition of high-quality provision, as well as to the important numbers of cyclists to be accommodated. Dutch guidance (CROW), for instance, recommends contra-flow cycling in mixed traffic if at least 3.85 m of free carriageway width is available. For a contra-flow cycle lane (of 1.5 m) at least 5 m is recommended. This obviously assures safety as well as comfort. Cyclists can drive side by side and easily cross cars and even trucks, without losing speed or momentum.
- For **starter or climber cycling cities** the **overriding concern is safety**. With lower numbers of cyclists, they first of all need to attract more cyclists. Often their urban areas have narrow streets, frequently with one-way traffic. They see the powerful incentive that widespread contra-flow cycling can be, opening up short and direct routes in a more cohesive cycling network. Applying the highest safety and comfort criteria, however, would make this nearly impossible because space is simply lacking. They believe that the potential network benefits are such that it is acceptable to compromise on comfort. The essential requirement is safety: can contra-flow cycling be safely accommodated with less space?

Initially, it was assumed that safety required sufficient road space. Over the last twenty years, in many countries and many cities, there have been cautious experiments with narrower carriageway spans. Empirical evaluations and accident statistics overwhelmingly show that **carriageway width has no significant impact on the safety of contra-flow cycling**. On the contrary, narrower streets have been shown to be safer: they force all road-users to slow down and to pay more attention to each other. Cyclists are consistently enthusiastic, and motorists accept well the need to slow down for safety. This is certainly valid for the typically short stretches in dense urban areas. On longer stretches or where traffic is more intense, the increased number of encounters may become a source of stress and irritation.

In most cities, recommendations for road width have been revised downwards. **Belgian national regulations** have gone furthest in drawing the conclusions from this.

- Since 2002, it has become **mandatory** for Belgian road managers to allow contra-flow cycling when there is **at least 3 m of available road space** and at **speeds of max. 50 km/h**, unless it can be explicitly argued that safety reasons militate against it. Hindering motorized traffic flow cannot be invoked as a sufficient reason not to allow contra-flow cycling.
- In addition to this obligation, it is legally possible to allow contra-flow cycling **from 2.6 m on** as well as at **speeds of over 50km/h**. A width of 2.6 m will actually force cars to slow down well below 30 km/h.
- Guidelines from the Belgian National Road Safety Institute recommend a carriage width of 3.5m to 3.8m in case of occasional bus or truck traffic. **Cycle lanes** (1.2m) are recommended in cases of **higher traffic intensities** and when the road is **also used by buses**.
- Following the same logic, contra-flow cycling can be combined with **parked cars with and against the flow**. Parking on the contra-flow side seems dangerous: cars need to cross the contra-flow cyclists; and the drivers are on the kerbside of their vehicle, so they cannot see approaching contra-flow cyclists. But, once again, the absence of accidents shows that there is no real risk, because cars drive slowly and all road users tend to be extra careful.

Safety thus seems guaranteed. But **local cycling comfort and speed undoubtedly suffer**. At a width of 3 m, cyclists cannot ride side by side when crossing a motorized vehicle. And a car cannot at the same time overtake a cyclist with the flow and cross another cyclist in contra-flow. In the very narrowest streets, crossing a truck will require the cyclist to step down and to the side of the road, between parked cars, or on the pavement. It should be remembered, however, that these situations are relatively rare in the generally quiet streets concerned. And cyclists, at least in starter cities, seem willing to accept the inconvenience, in exchange for the **wider cycling network benefits** of more direct and quiet routes, away from busier traffic, and often overall faster shortcuts.<sup>7</sup> Most importantly, cyclists feel very much appreciated, since contra-flow cycling **gives cyclists the advantage over motorized traffic**.

### *Design recommendations for extra safety and clarity*

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In the great majority of cases, allowing contra-flow cycling requires nothing more than the legally required signage and road markings. Surveys have shown that managers as well as drivers tend to overestimate the objective risks.

However, in **starter cities**, with low levels of cycling, some factors may complicate matters.

- Motorists are **unfamiliar with cyclists**, less used to sharing the roads with them, and contra-flow cycling may add to the confusion, causing surprise, incomprehension and irritation.
- The **novelty of contra-flow cycling** itself may need a period of adaptation for all users.
- The **subjective risk** (or perceived risk) may be an obstacle, especially for the less-experienced cyclist.

In order to guarantee safety and reassure all road-users, a number of additional design options can be considered. The aim should be **self-explanatory road design**.

- Optional **warning signs** can be installed on side roads. They alert motorists that cyclists may emerge from one-way streets. However, it has often been shown that signage is generally less effective than road markings.
- **Contra-flow advisory cycle lanes** may be added to a mixed traffic situation. These alert drivers and crossing pedestrians to the presence of cyclists. Bicycle signs, arrows and chevrons pointing in the contra-flow direction clearly indicate the cyclist's traffic path and avoid misunderstandings. For the cyclist, these markings additionally give the cycling network stronger visual continuity. **Additional markings at risk areas**, such as

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<sup>7</sup> Along very fast and busy roads, used by a great number of cyclist (main links), cycle tracks are always indispensable. A cycle track can also be in contra-flow, for instance along a one-way multilane arterial road. Technically, this does not belong to contra-flow cycling as it is usually defined. It is to be considered as a cycle track with its own signage, as discussed in another fact sheet.



intersections, pedestrian crossings or estate entry lanes can be considered, for instance using coloring or different materials.

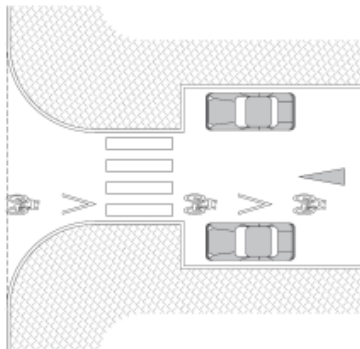
- **Removing parking spaces** at street corners can dramatically increase the visibility, and make potential conflicts more predictable for all. This is often combined with **pavement extensions**, which have the additional advantage of shortening crossing paths for pedestrians.
- **Marking contra-flow cycling space at entry and exit points and in road bends** is strongly recommended. In one-way streets cars tend to swerve to the left of the road.<sup>8</sup> When leaving a one-way street, a car waiting too far to the left may block a cyclist's entry in contra-flow direction. When entering, it can widen its radius and come face to face with an approaching contra-flow cyclist. Also in road bends, motorists feel safe because there are no facing cars, and may cut the corner. In all these cases, the cyclist's traffic path can be indicated by road markings, or slightly raised edges in distinctive material. These marking alert motorists to the traffic path of contra-flow cyclists. At the same time, they serve to remind the cyclist to be extra careful. At higher speeds or higher intensities, brief **physical segregation devices** must be considered.



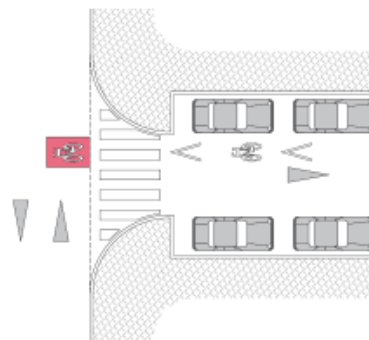
Contra-flow cycling alert sign on side road, Brussels, BE (D. Dufour)



Advisory cycle lane to alert motorists of contra-flow cycling in a road bend, Brussels, BE (D. Dufour)



Advisory cycle lane road markings alert drivers and pedestrians to the path of contra-flow cyclists (guidance Brussels, Be<sup>9</sup>)



An extra bicycle symbol on green background alerts motorists to exiting contra-flow cyclists (guidance Brussels, Be<sup>10</sup>)

## Considerations

### Strengths

- Contra-flow cycling significantly improves network continuity, cohesion, directness, attractiveness and safety, especially when generalized as a default option. Cyclists avoid riskier busy alternatives and can use shortcuts. As such it can be a strong incentive to cycling in urban areas with numerous one-way streets.
- Contra-flow cycling contributes to traffic calming. Speed is lowered through the visual narrowing effect of contra-flow cyclists.

<sup>8</sup> Read "right" for the UK.

<sup>9</sup> Source: Brussels Region, 2006 – *Vademecum marquage et signalisation des sens uniques limités*.

<sup>10</sup> Source: Brussels Region, 2006 – *Vademecum marquage et signalisation des sens uniques limités*.



## Give Cycling a Push Implementation Fact Sheet

- Contra-flow cycling can be widely applied at low cost (only road markings and signage), in narrow streets with slow and little traffic.

### *Weaknesses*

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- Piecemeal, isolated contra-flow cycling will have only a small local impact on network attractiveness. It may also create confusion or create resistance.
- In narrow streets, contra-flow cycling will often not meet the comfort and speed standards of total network quality. Cyclists will not be able to ride side by side, and will need to slow down when crossing a vehicle.

### *Alternative options*

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- To cycle against the flow on high-traffic roads, cyclists need to be separated on CYCLE TRACKS.