

Briefing

# CONTRAFLOW CYCLING

March 2018



**Contraflow cycling is when cyclists are allowed to ride against the traffic flow in a one-way street.** The use of contraflow cycling is common throughout Europe. Belgium, the Netherlands, Germany, France and the United Kingdom are among the countries that use it.

## 1. Background

There are various reasons for cities' traffic managers to use one-way traffic as a tool to organise traffic flows, including, among others, accommodating to the characteristics of the street (narrowness), increasing the availability of parking spaces, and guiding traffic in a specific direction.

It is however suggested by PRESTO, a project promoting cycling funded by the European Commission, that cyclists are strongly negatively affected by one-way streets and more so than other modes of road transport.<sup>1</sup> This as detours would be more strongly felt by cyclists both in terms of relative extra distance as well as extra energy, and cyclists would have to take more risky alternative roads and intersections. Other publications confirm that one-way streets can cause problems for cyclists as they are forced from safer smaller roads onto longer and more dangerous alternative routes.<sup>2,3</sup>

Introducing contraflow cycling would allow cyclists to ride against the traffic flow in a one-way street and thereby avoid the negative effects of one-way streets.

This briefing first looks into why streets with contraflow cycling are not riskier for cyclists than normal one-way streets. It subsequently sets out safety considerations regarding intersections, parked vehicles and crossing pedestrians which should nevertheless be taken into account. Finally, it provides an overview of recommended design principles for one-way streets with contraflow cycling.

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<sup>1</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling. For more information on the PRESTO project, visit: <https://goo.gl/VhDh7D>

<sup>2</sup> Department for Transport (2008) Cycle Infrastructure Design

<sup>3</sup> Sustrans (n.d.) Design Portfolio A.06 Contra-flow Cycling

## 2. The Safety of Contraflow Cycling

A literature review reveals that there is broad agreement on the fact that the introduction and use of contraflow cycling on certain types of roads does not increase the risks of a collision.<sup>4</sup> Instead, it is considered that it may have an overall positive effect on road safety.

### 2.1 Type of road: primary factor for risk of collision

A study on contraflow cycling in Brussels showed that, during the investigated period, the risk for cyclists to have a collision was four times higher at primary network roads and intersections than on the local network, where the vast majority (91%) of the contraflow cycling streets are located.<sup>5</sup>

The study also found that nearly half (47.8%) of all cycling collisions occurred at intersections. The results furthermore showed that only 126 out of 922 (12.7%) collisions involving cyclists occurred on roads where contraflow cycling is allowed.

The risk of a collision involving a cyclist is therefore more determined by the type of road and intersection than the existence of contraflow cycling.

By allowing cycling in contraflow on certain one-way streets, the journey for cyclists can become safer and more convenient than alternative routes, which are more likely to include longer and more dangerous roads.<sup>6</sup>

### 2.2 One-way streets vs contraflow one-way streets

The results from the study on contraflow cycling in Brussels showed that for the collisions involving cyclists that occurred on roads with contraflow cycling, only 47 of those collisions involved a cyclist travelling against the flow of traffic (37%), while 79 involved cyclists riding with the flow (63%).<sup>7</sup> Research in Germany also found that only one in three collisions on streets with contraflow cycling involved a cyclist riding against the traffic.<sup>8</sup>

A study by the German Federal Highway Research Institute furthermore suggests that opening one-way streets to contraflow cycling has a positive impact on the road safety of one-way streets.<sup>9</sup> A

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<sup>4</sup> For the titles of the publications used for the literature review, please consult the bibliography section.

<sup>5</sup> BIVV-IBSR (2014) Safety aspects of contraflow cycling. Detailed analysis of accidents involving cyclists on cyclist contraflows in the Brussels-Capital Region (2008, 2009 and 2010)

<sup>6</sup> Department for Transport (2008) Cycle Infrastructure Design

<sup>7</sup> BIVV-IBSR (2014) Safety aspects of contraflow cycling. Detailed analysis of accidents involving cyclists on cyclist contraflows in the Brussels-Capital Region (2008, 2009 and 2010)

<sup>8</sup> German Insurance Association (2016) Cycling roads and one-way streets with contra-flow cycling. Compact accident research

<sup>9</sup> German Federal Highway Research Institute (2001) Verkehrssicherheit in Einbahnstraßen mit gegengerichtetem Radverkehr

study in France found that while the number of cyclists on recently opened contraflow streets increased significantly, there was no increase in the amount of collisions.<sup>10</sup>

This supports the agreement that the use of contraflow cycling on one-way roads is not more dangerous than one-way roads without contraflow cycling. In fact, the results may even suggest that riding against the flow of traffic is in fact safer than riding with it.

### 2.3 The safety explained

A suggested explanation for the safety of contraflow cycling is the 'risk compensation effect': drivers act in a more cautious way when driving on a road with oncoming cyclists as they perceive a higher risk on such roads.<sup>1112</sup>

Another explanation would be improved visibility, as cyclists and drivers have more visual contact which will allow them to better assess the situation.<sup>1314</sup> Cyclists would furthermore refrain from riding illegally on the pavements, thereby improving the safety for pedestrians on such roads.<sup>15</sup>

While vehicles and contraflow cyclists might find navigating narrow streets more difficult, they are not considered to be a major accident factor and are instead actually found to be safer than wider roads, as road users are forced to slow down and be more attentive.<sup>1617</sup> In this regard, the Brussels study found that there were less collisions on narrow streets than their share in the road network.<sup>18</sup>

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<sup>10</sup> Mairie de Paris (2011) Bilan de la mise en place des double sens cyclables à Paris

<sup>11</sup> German Insurance Association (2016) Cycling roads and one-way streets with contra-flow cycling. Compact accident research

<sup>12</sup> Vandenbulcke, Thomas and IntPanis (2014) Predicting cycling accident risk in Brussels: a spatial case-control approach

<sup>13</sup> Ibid.

<sup>14</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling.

<sup>15</sup> German Insurance Association (2016) Cycling roads and one-way streets with contra-flow cycling. Compact accident research

<sup>16</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling.

<sup>17</sup> BIVV-IBSR (2014) Safety aspects of contraflow cycling. Detailed analysis of accidents involving cyclists on cyclist contraflows in the Brussels-Capital Region (2008, 2009 and 2010)

<sup>18</sup> Ibid

### 3. Safety Considerations

While there is agreement that one-way streets allowing for contraflow cycling are safe, there are nevertheless several safety concerns which should be taken into account.

#### 3.1 Intersections

Research from Germany, France and Belgium shows that a significant amount of collisions involving contraflow cyclists occur at intersections. Of the 47 collisions in Brussels involving contraflow cyclists, 31 collisions (66%) occurred at an intersection.

The collisions at Brussels' intersections were caused by failure to give way, poor positioning at the intersection, and a turning vehicle that cut across the path of the cyclist.<sup>19</sup> In Germany, over 70% of the collisions involving contraflow cyclists at intersections occurred due to a vehicle failing to give way and turning into or cutting across the road.<sup>20</sup>

The PRESTO project summarised that dangerous situations at crossings occur through a combination of three factors:<sup>21</sup>

- I. Cyclists have the right of way, emerging in contraflow direction from a one-way street;
- II. The paths of a vehicle and cyclist intersect;
- III. Drivers do not give right of way to cyclists, out of either ignorance or inattention.

#### 3.2 Parked vehicles

Another main cause of collisions with contraflow cyclists is when vehicles are leaving their parking space. It was the fourth largest cause for collisions in the Brussels study, accounting for 6 of the 47 collisions.<sup>22</sup>

However, these situations are not more dangerous for contraflow cyclists than for cyclists following the flow of the traffic in any given street.<sup>23</sup>

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<sup>19</sup> Ibid

<sup>20</sup> German Insurance Association (2016) Cycling roads and one-way streets with contra-flow cycling. Compact accident research

<sup>21</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling.

<sup>22</sup> BIVV-IBSR (2014) Safety aspects of contraflow cycling. Detailed analysis of accidents involving cyclists on cyclist contraflows in the Brussels-Capital Region (2008, 2009 and 2010)

<sup>23</sup> Department for Transport (2008) Cycle Infrastructure Design

### 3.3 Crossing pedestrians

Pedestrians crossing the road are another cause of accidents on streets where contraflow traffic is allowed. These accidents are generally caused by pedestrians crossing the street without checking for possible contraflow cyclists approaching.<sup>24</sup>

Research in Germany found that collisions with pedestrians crossing the street mainly occurred on shopping streets with contraflow cycling.<sup>25</sup>

## 4. Designing Safe Infrastructure

The following sections give an overview of recommended design principles for one-way streets with contraflow cycling.

### 4.1 Contraflow cycling as standard

Both the PRESTO project and the UK Department for Transport recommend that contraflow cycling on one-way streets should always be considered, provided that it can be safely accommodated.<sup>26,27</sup>

The PRESTO project even recommends that contraflow cycling should be the standard on one-way streets, as it argues that if contraflow cycling is only allowed on a limited amount of one-way streets, this would mean that the situation remains uncertain at all one-way streets. Instead, if contraflow cycling is the default principle, it would make the situation more predictable for all road users, and drivers would be more aware of potential contraflow cyclists.

As established in section 2.1, contraflow cycling can be safer than taking an alternative route, which is likely to be longer and more dangerous. The safety concerns identified by the safety audit assessing whether contraflow cycling should be allowed on a specific one-way street, should therefore be balanced against the likely risks faced by cyclists having to take an alternative route.<sup>28</sup> Said differently, the risks cyclists avoid by allowing contraflow cycling should be taken into account.<sup>29</sup>

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<sup>24</sup> BIVV-IBSR (2014) Safety aspects of contraflow cycling. Detailed analysis of accidents involving cyclists on cyclist contraflows in the Brussels-Capital Region (2008, 2009 and 2010)

<sup>25</sup> German Insurance Association (2016) Cycling roads and one-way streets with contra-flow cycling. Compact accident research

<sup>26</sup> Department for Transport (2008) Cycle Infrastructure Design

<sup>27</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling

<sup>28</sup> Sustrans (n.d.) Design Portfolio A.06 Contra-flow Cycling

<sup>29</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling



## 4.2 Contraflow cycling lanes

Dedicated contraflow cycling lanes are recommended for one-way streets where the average speed is over 30 km/h in urban areas, and over 60 km/h in rural areas.<sup>30</sup> The cycling lane itself should have a minimum width of 1.5 meters and could be accompanied by waiting restrictions to ensure the contraflow cycling lane is not obstructed.<sup>313233</sup>

Advisory contraflow cycling lanes are recommended for streets where the average speed is 30km/h or where the traffic is less than 1000 vehicles a day.<sup>34</sup>

No contraflow cycling lane markings can be considered on roads inside 30km/h zones as well as on roads with an average speed of 30km/h and where the traffic is less than 1000 vehicles a day.<sup>3536</sup> Lane-less streets can also be considered on roads in rural areas with an average speed up to 60km/h.<sup>37</sup> In streets where contraflow lane markings are absent, it is recommended to nevertheless have (lane) markings at the entry and exit points as well as in bends, in order to raise awareness of other road users that contraflow cyclists can be encountered.<sup>3839</sup>

## 4.3 Entry-exit points and intersections

Although not considered essential, entry and exit points for contraflow cyclists separated from normal traffic through segregation devices are recommended, notably at streets with higher average speeds and/or traffic intensity.<sup>404142</sup>

Given that the majority of collisions occur at intersections, it is recommended that the safety of each intersection is assessed based on for example the existence of proper markings, signage and visibility. Alternatively, in order to improve visibility, the removal of parking places near the intersection should be considered. Additional safety benefits for pedestrians could be gained by extending the pavement on those places, thereby shortening their crossing path.<sup>43</sup>

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<sup>30</sup> Ibid

<sup>31</sup> Ibid

<sup>32</sup> Sustrans (n.d.) Design Portfolio A.06 Contra-flow Cycling

<sup>33</sup> Department for Transport (2008) Cycle Infrastructure Design

<sup>34</sup> Ibid

<sup>35</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling

<sup>36</sup> Department for Transport (2008) Cycle Infrastructure Design

<sup>37</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling

<sup>38</sup> Ibid

<sup>39</sup> Department for Transport (2008) Cycle Infrastructure Design

<sup>40</sup> Ibid

<sup>41</sup> Sustrans (n.d.) Design Portfolio A.06 Contra-flow Cycling

<sup>42</sup> PRESTO (n.d.) Fact Sheet Contra-Flow Cycling

<sup>43</sup> Ibid

Appropriate signage should also be installed at intersections where side roads lead onto the contraflow lane, in order to make drivers aware of possible contraflow cyclists. This can be done for example by introducing speed reducing measures as well as a coloured surface for the cycling lane at the crossing.<sup>44</sup>

#### 4.4 Signage

The existence of proper signage is a method to implement contraflow cycling. However, whether and which signs can be used to make contraflow cycling on one-way streets possible depends on the legislation in each country, and segregated lanes at entry might be needed.

It is also recommended to have specific signage for contraflow cyclists leaving the street, including stop signs, marking and, if applicable, traffic signals.<sup>45</sup>

In general, there should be sufficient signage to warn all road users, and notable at intersections where contraflow cyclists have the right of way.

#### 4.5 Parking

Having parallel parking places on the opposite side of the traffic flow (left for mainland Europe, right for the UK and Ireland) would greatly reduce the risk and severity of collisions occurring due to drivers opening their doors without looking. However, it may encourage contraflow cyclists to ride in the middle of the street, which causes them to be in a riskier position at intersections. Additionally, pedestrians may have less visibility when crossing the street.<sup>46</sup> Furthermore, the driver has limited visibility of the upcoming contraflow cyclists, as the driver is on the far side of the car.<sup>47</sup>

With regards to echelon parking, it is recommended that the parking places are designed in a way that drivers have to reverse into them. While leaving the parking place, drivers would then face upcoming contraflow cyclists.<sup>48</sup>

It is furthermore recommended that the echelon parking spaces are not on the side near the contraflow traffic, as drivers reversing out of them might not look out for contraflow cyclists.<sup>49</sup>

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<sup>44</sup> Sustrans (n.d.) Design Portfolio A.06 Contra-flow Cycling

<sup>45</sup> Ibid

<sup>46</sup> BIVV-IBSR (2014) Safety aspects of contraflow cycling. Detailed analysis of accidents involving cyclists on cyclist contraflows in the Brussels-Capital Region (2008, 2009 and 2010)

<sup>47</sup> Sustrans (n.d.) Design Portfolio A.06 Contra-flow Cycling

<sup>48</sup> Department for Transport (2008) Cycle Infrastructure Design

<sup>49</sup> Sustrans (n.d.) Design Portfolio A.06 Contra-flow Cycling



#### 4.6 Pedestrian crossings

Pedestrians at designated crossing points should have sufficient visibility in order to determine whether contraflow cyclists are approaching, which may include adjusting parking arrangements to ensure visibility. Pedestrians in shopping streets should furthermore be warned of possible contraflow cyclists through the use of road markings and signs.<sup>50</sup>

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<sup>50</sup> German Insurance Association (2016) Cycling roads and one-way streets with contra-flow cycling. Compact accident research

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