

**Summary:**

# Counter-flow cycling

## Evaluation of counter-flow cycling in one-way streets in Oslo city centre

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*As part of a policy to improve cycling conditions in Oslo, counter-flow cycling was permitted and cycle lanes were installed in both directions of the one-way streets Kirkegata and Skippergata. Surveys were conducted before and after the implementation in 2011, comparing road users in the two trial streets with those in two control streets. Results reveal that cyclists in the trial streets were satisfied with counter-flow cycling, cycled more in the streets and less on pavements, and felt more secure. Opinions among pedestrians and car drivers were mixed. Pedestrians felt slightly less secure after the implementation, but despite this were generally in favour of counter-flow cycle lanes in one-way streets. Car drivers were negative about the new cycle lanes in the one trial street where parking facilities had been removed, but opinions were mixed in the other trial street.*

*Video observations reveal that counter-flow cycling led to few traffic conflicts. Thus such a measure would not seem to be detrimental to road safety.*

### Introduction

As part of a policy to improve cycling conditions in Oslo, counter-flow cycling was permitted and cycle lanes were installed in both directions of the one-way streets Kirkegata and Skippergata. In Kirkegata counter-flow cycling was permitted from Stortorget to Rådhusgata; in Skippergata it was permitted from Biskop Gunnerus' gate to Rådhusgata.

In both streets cycle lanes were implemented in both directions with signposts and special traffic signals for cyclists travelling against the normal traffic flow. The cycle lanes were marked with red asphalt and combined with advanced stop lines and "cycle boxes".

The purpose of the present study is to evaluate the effects of this measure on travel behaviours, comfort, subjective safety and ease of access among pedestrians, cyclists and car drivers. In addition an important aim has been to consider the safety consequences of this measure.

## Method

The evaluation was conducted as a before/after study in the trial streets, using two other streets as control streets. We conducted interviews with cyclists, pedestrians and car drivers in both the experimental streets and the control streets, before and after the measures were implemented, i.e. in May-June 2011 and May-June 2012. Counter-flow cycling was permitted and cycle lanes in both directions were installed in the experimental streets on 29<sup>th</sup> August 2011.

Interviews were conducted using a standardized questionnaire with some slight adjustments made according to the different road user groups. In addition to the interviews cycle traffic in all four streets was counted by the City agency responsible for the measure, both before and after measure implementation. They also counted cycle volumes in different directions, the number cycling on the pavements and the number cycling against red lights. They also registered whether motorized road users (e.g. mopeds) increased counter-flow driving in the experimental streets as a response to the measure.

In order to investigate the road safety consequences of permitting counter-flow cycling, the road users were asked how safe they felt traffic conditions were in the streets before and after counter-flow cycling was allowed. We also studied the level of traffic conflicts in one of the experimental streets (Skippergata) by use of video recordings. More than 70 hours of footage was recorded and analyzed.

A traffic conflict is an event where one or more road users have to brake abruptly or to turn sharply away to avoid collision.

## Results

### **Cyclists are satisfied, they cycle more and use the pavements less**

Cycling increased in the experimental streets after the measures were implemented, and cycling on pavements were reduced. Cycle counts reveal that cycling volumes increased by approximately 50 percent, both in Kirkegata and in Skippergata, while cycling volumes decreased in the control streets. Cycling against the normal traffic flow increased in the experimental streets in particular, indicating that the cyclists to a large degree were using the new counter-flow cycling lanes. Some of the increased cycle traffic may be the result of transfer of cycle traffic from neighbouring streets.

Cycling on pavements was reduced from 47 percent to 22 percent in Kirkegata and from 23 percent to five percent in Skippergata. The main reason why pavement cycling is greater in Kirkegata is that its pavements are very broad compared to those in Skippergata and elsewhere. In the control streets the proportion of cycling taking place on the pavements did not change from 2011 to 2012.

In the interviews cyclists also stated that they cycled less on the pavements in the experimental streets after counter-flow cycling was permitted. They considered the cycle conditions to be very good both in Kirkegata and in Skippergata after introduction of the measure. In contrast, in 2011 the cyclists were very dissatisfied with the cycle conditions in these streets. In general the cyclists stated very clearly

that it is sensible to permit counter-flow cycling and to implement marked cycle lanes in both directions in one-way streets in the city-centre.

### **Pedestrians do not notice much difference**

Pedestrians were somewhat more insecure in the experimental streets after counter-flow cycling had been permitted. However, they considered cycling on the pavements to be less of a problem than before. The insecurity they reported may be due to the fact that they now had to consider traffic from both directions when crossing the street. They also felt that the conditions for pedestrians in the experimental streets had worsened somewhat after counter-flow cycling had been allowed.

It is possible that the pedestrians felt conditions to be worse because there was quite a lot of construction work going on in both trial streets during the after period. This work blocked pavement access in certain areas on both streets, forcing pedestrians out into the traffic lanes. It is thus possible that pedestrian attitudes reflect these adverse conditions and not the fact that counter-flow cycling has been allowed.

One indication that this might be the case is that most of the pedestrians in all four streets felt that counter-flow cycling combined with marked cycling lanes in both directions is a sensible measure, and that there were no indications that the opinions about this are less positive in the experimental streets than in the control streets.

### **Car drivers are sceptical**

Car driver opinion about counter-flow cycling differed between the two experimental streets, Kirkegata and Skippergata. Drivers in Kirkegata stated clearly that conditions for drivers were worse after counter-flow cycling had been allowed. This is not surprising given that all car parking areas were removed when the cycling lanes were installed in Kirkegata. Access for delivery of goods to shops was also reduced by the installation of cycle lanes.

In Skippergata there were no differences in driver opinion about the conditions for car driving before and after the cycle lanes were installed and counter-flow cycling was permitted. Furthermore there were no differences in how safe they felt it was to drive in the street. In Skippergata, more drivers stated in 2012 that counter-flow cycling is a sensible traffic measure than they did in 2011.

If survey responses for two experimental streets are grouped together, there is no statistically significant change in the percentage who believe that counter-flow cycling and bike lanes in both directions is sensible.

Both car drivers, cyclists and pedestrians believe that it is good that cycle lanes are indicated by red-coloured asphalt.

## Few conflicts

To investigate traffic conflicts, we carried out 70 hours of video observations of the traffic in Skippergata on weekday daytimes in 2012. The Comfort Hotel Børsparken, which has a façade facing Skippergata, placed a corner room on the third floor at the projects disposal. A video camera was placed facing East (direction of travel) overlooking the quarter between Tollbugata and Prinsens gata as well as the cycle lane on the left side of the street in the quarter Skippergata – Karl Johans gate. The films were reviewed and conflicts were registered manually by a research assistant, and then reviewed and checked by two of the researchers.

Cyclists approaching from the east (against the direction of travel) were counted and conflicts were registered. In the quarter Karl Johans gate-Prinsens gate three conflicts were registered (involving 0.3 percent of passing cyclists). In the quarter Prinsens gate-Tollbugata six conflicts were recorded (involving 0.6 percent of passing cyclists). The proportions of conflicts recorded were lower than for many other cycling lanes in Oslo.

Most conflicts occurred in the quarter the Prinsens gate-Tollbugata where construction work was ongoing in the registration period. Most conflicts were related to this work.

## Conclusion

Cyclists were satisfied with the new counter-flow cycling regime, they cycled more in the streets, less on pavements, and felt safer. The opinions of pedestrians and car drivers were more mixed. Pedestrians felt slightly less secure, but despite this were generally in favour of counter-flow cycle lanes in one-way streets. In the one street where parking facilities had been removed as a result of the trial, car drivers were negative about the new cycle lanes. In the other trial street car driver opinion was mixed.

Motorized vehicles rarely run against the flow of traffic in these one-way streets, and there is no indication that this happens more frequently just because the cyclists are permitted to do so.

Conflict registrations revealed that counter-flow cycling leads to few traffic conflicts. To the extent that they were registered, conflicts were particularly related to construction work in the streets, which blocked cycle lanes (and pavements) and forced cyclists (and pedestrians) out into the road amongst the car traffic. Although this was unfortunate, the speed of both cars and bikes in these streets was generally low. Thus even if cyclists were occasionally forced to cycle in the road against the flow of traffic, road users managed to adapt to each other so that dangerous situations seldom occurred.