

Summary

An evaluation of Shared space locations in Norway

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"Shared space" means that the squares and streets are shared between different groups of road users without or with limited use of signs, markings and physical separation. Instead of clear rules and regulations of rights to different road sites, the idea is that road users should interact or negotiate to find concrete solutions in terms of who should give way and who should pass first. In this project, we have evaluated six areas in Norway which are more or less designed according to Shared space principles: St. Olav's place in Oslo, Bekkestua center in Bærum, Strømsø square in Drammen, Markens street in Kristiansand, Nordre street in Trondheim and Torggata (street) in Oslo. The results show that Torggata and Nordre street to a small extent acts as Shared space. Nordre street functions as a pure pedestrian street. Torggata has very many conflicts between pedestrians and cyclists. The other areas have few conflicts. Road users are generally satisfied with the design, and most happy at Strømsø square and on Bekkestua. The results confirm that Shared space solutions may work well if achieving low speed, balance between road users and even distribution in who yields to whom.

How does "Shared space" work in Norway?

The Norwegian Public Roads Administration (NPRA) wanted a review of experiences with so-called "Shared space" - areas in Norwegian cities and towns. Shared space means to design urban and street spaces with no or very few regulations in the form of signs, physical separation and markings. The idea is that if the speed is sufficiently low, there is no need to separate different groups of road users from each other. Instead of clear rules and regulations the idea is that road users should interact or negotiate to find concrete solutions in terms of who should give way and who should pass first.

Shared space with different degrees of regulation has been implemented in several European cities, including in Denmark, Sweden, Netherlands, UK, Germany and Switzerland. There is also great interest in establishing Shared space in many Norwegian cities, with concrete plans for example in Kong Oscars street in Bergen, and at Franklin square in Porsgrunn.

Foreign experience suggests that Shared space works very well with regard to traffic flow and traffic safety. Most studies conclude that Shared space can work well if one achieves low speed, and balance in the number of different road user groups.

Video Recordings in six areas - interviews in eight

In consultation with NPRA, we chose the following six areas for video registrations:

- Torggata, Oslo
- St. Olav's square, Oslo
- Bekkestua center, Bærum
- Strømsø square, Drammen

- Markens street (cross Markens street/Tordenskjolds street), Kristiansand
- Nordre street (cross Nordre street/Dronningens street), Trondheim

We also conducted interviews with road users on these sites. In addition, we also did interviews on Christiania square in Oslo, which also has many Shared space-characteristics, and Advokat Dehli's square in Oslo, which is a traditional roundabout.

The six locations selected for video recordings are shown below in figure S1.



Figur S1. The six locations selected for video recordings. From the top, from left to right: Torggata, St. Olavs square, Bekkestua center, Strømsø square, Markens street and Nordre street. Photos from video camera (Torggata, St. Olavs sq., Bekkestua center, Nordre st.), from Google (Strømsø sq., Markens street).

Good interaction many places

Video data were analyzed using the program T-Analyst. We examined how many road users who were in the area on a typical weekday, the speed of cyclists and cars and the interaction between different road users. We studied distributions in yielding patterns between road user types, and near-misses or conflicts, i.e. that one or more had to brake heavily, jump or swing away to avoid collision.

On St. Olav's square, Bekkestua, Strømsø and Markens, the distribution of yielding behaviour between the different road user groups was relatively even. This means that no road user group had acquired an apparent "right of way". However, in Torggata and in Nordre street this was not the case. In Torggata, a clear majority of both pedestrians and motorists yielded to cyclists, probably because many perceive Torggata as a cycle street where cyclist have priority. In Nordre street, almost all cars yielded to pedestrians (here there were few cyclists).

A small stretch of Torggata (between Hammersborggata and Badstu street), is regulated as a cycle street (cycle lane signs), forbidden to cars. However, in the observation area the street is regulated as a city street allowing for both cars, cyclists and pedestrians, but with special physical design elements to promote cycling

In Torggata there were 56 conflicts. On the other places there were far fewer. In Kristiansand, we did not detect any conflicts, in Trondheim only one. On St. Olav's square we recorded 11 conflicts in the autumn and four in winter (March 2016). The reason why there were fewer conflicts in winter may be because the cyclist percentage then was much lower. Cyclists were involved in seven of the 11 conflicts that were recorded at St. Olav's square in autumn 2015. On Bekkestua and Strømsø we recorded four conflicts on both locations. In terms of traffic conflict proportion the conflict rate is comparable to conflict rates in other traffic areas in Norway. Torggata has far more conflicts than other areas with almost one in five interactions being a conflict.

Our analyzes show that conflict percentage is very much larger in Torggata than in the other places. Torggata is a little special in that this is launched and partly regulated as "cycling street" which probably has created expectations for cyclists to be able to cycle uninterrupted, while pedestrians largely behave as in a pedestrian street. Video registrations illustrate many cases of this; pedestrians cross the street without looking, while cyclists go faster here than they do at the other places. Torggata has thus far the most conflicts, and it is a solution that currently is not working particularly well.

Road users most satisfied on Strømsø square and Bekkestua

There are clear differences in how road users consider the different locations. Strømsø square and Bekkestua center is generally considered as very successful, regardless of whether we ask about traffic flow, interaction, whether it is nice and appealing etc. Christiania square receives negative evaluations on the same measures, apart from the question whether it is visually attractive. At least as many people find it as pretty on Christiania square as at the other places.

Except when it comes to perceptions of how pretty it is on site, Christiania square differs dramatically from the other areas. Many feel that it is unsafe to travel here. Three out of four believe that the place is not working well. The main reason why the square is perceived as unsafe and dysfunctional is probably that there is much traffic through the place, and a lot of heavy traffic in the form of buses.

There is an interesting tendency that the places where road users are most likely to experience that the space functions well, are the same places where road users report less "negotiations". At Bekkestua, Strømsø and Kristiansand cyclists are not coming on as strong as on the other places, and it is also these areas people perceive to work best. Perceptions in Kristiansand are however much like in Torggata and at St. Olav's square when it comes to this latter issue.

Markens street in Kristiansand has many similarities with Nordre street in Trondheim, but the responses from road users are more positive in Trondheim. For example, 30 percent of pedestrians says that the place is more or less unsafe in Kristiansand against only 10 percent in Trondheim. One possible reason for such differences is that the speed of the vehicles is higher in Kristiansand. Another difference is that there are far more cyclists in the area in Kristiansand.

Recommendations

Based on analyses of the six Shared space-places we have studied in Norway, and on Norwegian and international research literature, it is possible to give both general and concrete recommendations if and when establishing Shared space areas.

Firstly, road users should be informed when a site is Shared space for example with an appropriate sign for "Shared Zone" or the like. This is not the practice in Norway today, although it has been done (e.g. at Bekkestua right after reconstruction). Signs of Shared space is however common in many other countries.

Secondly, it should also be made clear how the traffic law is to be understood in such areas. Generally, the rule is to give way to traffic from the right, unless otherwise indicated. This is an established rule in terms of yield situations between vehicles, but not for situations between pedestrians and vehicles. It is however an established rule to yield for pedestrians in "gatetun" which is an established regulation in Norwegian cities with many Shared space characteristics. In case of a collision in Shared space areas the right-hand rule will probably be invoked if there are two vehicles involved. If there is a vehicle and a pedestrian, the likely rule to invoke would probably be to give way to pedestrians. This is however not clear today and it will be an advantage if this is clarified in traffic rules.

Thirdly, one should follow established principles for the design of Shared Space-regions. The main ones are:

- Special paving deviating from normal streets
- Raised area with a ramp for the traffic into the area that signals that it receives a special area which causes the motor vehicle slows
- The traffic should preferably take place on the same level, possibly with a small difference in level between the area for motorists and area for pedestrians (cf. Strømsø)
- Driving lanes physically marked and separated can be a good solution and create security and overview; Knowing where the motorized traffic is moving (f. ex. in Bekkestua). To avoid high speed and "right of way" such layouts should be combined with speed reducing measures (curves, physical restrictions).
- There should be a reasonably uniform distribution between different groups of road users, at least between pedestrians and vehicles.

- There should be a relatively balanced distribution of yielding behaviour in the interactions between the different road user groups. The most successful Shared spaces in this review are those with a fairly balanced yielding pattern, with yielding frequencies of between 40 and 60% between different road user groups.
- The speed should be low (a maximum of 25 km/h).

In this project, we have seen that there are particular challenges in Torggata in Oslo. Torggata have high conflict share probably because pedestrians largely perceive this as a pedestrian street, while cyclists perceive it as a cycle street. In addition, there are also other elements that contribute to problems here.

The street is relatively narrow with many shops and cafes on both sides. Many shops and cafes use the pedestrian pavement area for placement of goods, seating, signage and advertising etc., restricting pedestrian traffic on the pavements. The paving of Torggata is special; it looks like cobblestones, but is a special bike friendly coating. It may give pedestrians the perception of this being a pedestrian street.

In general, one should avoid establishing cycle streets in streets with many shops and other attractions, and especially when they are located on both sides of the street. It causes many pedestrians to cross. These are aspects one attaches great importance to in for example The Netherlands in the design of "sustainable safe streets".

A specific recommendation for Torggata is to put up signs that this is a cycle street, or that this is or Shared space - depending on what one wants to achieve. The idea behind the current design has been that this would be a cycle street and better signing of this could possibly contribute to more accurate expectations. Another measure, which admittedly reduces the street's attractiveness, would be limiting retailers and cafes opportunities to use the pavement area.

Torggata is the first cycle street in Norway. This is a solution Norwegian road users are not accustomed to and it is possible that this solution will work better as road users get used to it. We know that changes in road and street design can lead to conflicts that recedes as road users learn to adapt. A follow-up study in autumn 2017 would be interesting to show whether conflict Shares have declined without special measures.

Conclusion

For an area to be designated as Shared space, a series of criteria should be met. It applies to the design, with alternative paving, absence of signs and light signals, street furniture etc. Traffic distributions and yielding patterns should be balanced.

St. Olav's space, Strømsø square, Bekkestua center and Markens street serves as Shared space areas on the basis of our criteria. Here not one road user group dominates in number, and no road-user has acquired a dominant "right of way". Road users are particularly pleased with Bekkestua center and Strømsø square, but it is also clear majority who believe that St. Olav space and Markens street work well. People like to walk in those places, most people feel it is safe and a majority say they feel the Shared space solution works well.

Our findings are largely consistent with what previous studies have concluded that Shared space solutions may work well if low speeds, balanced traffic and yielding patterns are achieved. The results also show that there are challenges in Torggata, with a large proportion of conflicts between cyclists and pedestrians. After rebuilding, Torggata was launched and partly regulated as a bicycle street, but is designed so that many pedestrians perceive it as a pedestrian street.

