

Summary

Pedestrians' perceptions of operation and maintenance

Results from a survey in nine Norwegian cities

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The zero-growth target for passenger car traffic indicates that growth in traffic should be met with increased use of walking, bicycling, and public transport. More knowledge about operation and maintenance is needed to achieve an effective and safe shift towards active mobility. In this survey, we collected 2745 Norwegian pedestrians' assessment of various conditions related to operation and maintenance both in summer and in winter. The results show that women are more concerned about difficult conditions than men, especially in winter when conditions are most difficult. In particular, the older women (60 + years) find winter conditions to be difficult and they experience inadequate operation and maintenance in winter. As in previous surveys, we find that poor operation and maintenance can have major consequences for how pedestrians experience traveling, route choices and means of transport. Four out of ten say they would walk more in the winter if road maintenance and operation were better. Although many are satisfied with operation and maintenance for pedestrians, the survey shows that better operation and maintenance can lead to more people walking, especially during winter.

Background

The zero-growth target for passenger car traffic indicates that growth in traffic should be met with increased use of walking, bicycling, and public transport. The national walking and cycling strategies also aim for people to walk and cycle more. To achieve this, operation and maintenance must be executed in a way that makes it easy to choose walking or cycling. Knowledge is needed to recommend good solutions that promote walking and cycling without compromising safety.

The research and development program "Better operation and maintenance for more pedestrians and cyclists" (BEVEGELSE) is investigating the level of effort and methods of operation and maintenance that lead to increased pedestrian and bicycle traffic. Several municipalities, including Stavanger, Kristiansand, Vefsn and Trondheim municipality, are participating in the project to share knowledge and experience.

A distinction is made between tasks that ensure good daily traffic flow (operation) and measures that ensure the long-term function of the infrastructure (maintenance). Previous research shows that maintenance and operation have major implications for the choice of transport mode, route choice and comfort, and that difficult road conditions are experienced differently by different population groups.

This report presents the results of a comprehensive survey of pedestrians' experiences and opinions on the operation and maintenance of pedestrian infrastructure, with emphasis on geographical and demographic differences.

Methods

We conducted a survey with a relatively large sample of pedestrians in order to examine their perceptions of the operation and maintenance of pedestrian infrastructure. We

established a cooperation with the Norwegian Automobile Association (NAF), the Norwegian Disability Association and the Pensioners Association. NAF sent a link to the questionnaire by e-mail to their members in the selected areas, the other two associations provided information and links through newsletters to members. We wanted to recruit large groups of ordinary pedestrians in urban areas in Norway, and to reach groups that are particularly dependent on operations and maintenance for mobility. 2745 people agreed to participate in the survey, 1644 from NAF and 1083 from TØI's own mailing lists. This yields a response rate of 11% and 23% respectively. From the contacts of the Pensioners' Association and the Disability Association, 38 respondents were recruited. It is not possible to calculate the response rates from these sample sources.

Results and discussion

Women and the elderly are most affected by difficult conditions

Women experience various difficult walking conditions as more challenging than men. This is especially true of winter conditions. Women therefore use spikes for walking to a much greater extent than men, but still they experience icy conditions as much more problematic. Women also experience snowfall on sidewalks as more challenging, and find plowing conditions as less adequate than men. Women find ice and snow to be more challenging and choose to walk other routes in the winter to a greater extent than men.

We also find clear effects of age, i.e. that older people experience many conditions as more problematic than younger people. In winter, there may be deep snow on the pavement, and snow from the road surface is often shoveled up on to the pavement creating difficult walking conditions. In summer, the most problematic conditions are bumps and uneven pavement surfaces on walkways. The findings agree quite well with the results from the survey of cyclists which was carried out as part of the "BEVEGELSE" program and which contained partly the same questions (Johansson & Bjørnskau 2020).

Winter more difficult than summer

Holes in the road or on the pavement are perceived as the most problematic challenge for the respondents in this sample both in winter and in summer. Apart from that, there is a tendency for difficult conditions in the winter to be perceived as more demanding than difficult conditions in the summer. Snow and ice make roads and walkways impassable and slippery and as a consequence many pedestrians choose to take other routes in the winter or use a car or other means of transport than walking.

Four out of ten say they would have gone out more in the winter if operation and maintenance had been better. It is well documented that snow and ice are real risk factors for pedestrians. In Oslo, two out of three injuries occur among pedestrians in the winter because they slip on slippery surfaces. Such damages amount to almost 3,000 of a total of approx. 6,000 annual injuries among pedestrians in Oslo (Bjørnskau & Sundfør 2017).

Geographical differences

We have seen significant geographical differences in how often different winter conditions occur. This is as expected, and in compliance with results from the cyclist survey (Johansson & Bjørnskau 2020). Jæren and Stavanger in particular, but to some extent also

Bergen, have winter conditions that differ from the rest of the areas covered, with less snow and ice.

We also find large differences between geographical areas when it comes to the respondents' experience of the quality of operation and maintenance. Especially in Oslo, Trondheim and Tromsø many respondents say that winter operations are poor.

Tromsø stands out as the area with the largest proportion saying that they often experience a lot of snow on sidewalks. Oslo is the area where most people experience shiny ice. This is perhaps a little surprising given that Oslo invests so much in bare road standards. The respondents from Trondheim and Kongsberg are the ones who to the greatest extent believe that too much salt is used, at the same time as they are among those who want sanding to be used more. This may indicate that people in Trondheim and Kongsberg believe that salting should be replaced by sanding.

In general, pedestrians do not think that too much salt is used on sidewalks and on pedestrian and cycle paths. However, on larger roads there is a majority who think that too much salt is used.

Walking conditions are important for the pedestrians' experiences and choices and the risk of injuries

When conditions are difficult, the respondents report that this creates problems and that they have major consequences for them, especially if there is a lot of snow, shiny ice and slush. In such cases, they travel much more carefully, and many report that they adapt by using a car or other means of transport instead of walking, or that they do not travel.

Also in the summer, there are some conditions that are perceived as problematic for pedestrians. The biggest problem, both summer and winter, is holes in the road or on sidewalks. These are both conditions that people think are most problematic while at the same time these are among the conditions that they experience most often. Hence, with respect to holes and uneven surfaces there is a great potential to improve the safety and security for pedestrians in Norway, and thus make walking more appealing.

Injury data from the Oslo Accident and Emergency Outpatient Clinic show that slipping and falling is the most common type of accident among pedestrians in Oslo, but also stumbling due holes, bumps or curbs is a common accident mechanism. In the summer, four out of five pedestrian injuries are due to the person stumbling (Bjørnskau & Sundfør 2017).

Next to hollow and uneven surfaces, surface water was a problem, especially for the elderly and especially in some areas.

How to get people to walk more?

Overall, the results of the survey clearly show that operation and maintenance are important for road users' experiences, route choices and means of transport, and that better operation and maintenance can make more people walk, increase the amount of walking among those who walk, and reduce the risk of slips and falls. Especially when it comes to winter conditions, there is a potential to increase the extent of walking through better operation and maintenance. In the winter, many are calling for better infrastructure and better operation. We have seen that slippery / shiny ice are particularly difficult conditions, but also that deep snow creates great difficulties for many pedestrians. Four out of ten respondents say that they would have gone out more often in the winter if snow and

ice had been cleared better than it is today. This means that better winter operations are likely to make walking more appealing and lead to more people choosing to walk.

Conclusion

This study has looked at how Norwegian pedestrians assess various conditions related to operation and maintenance both in summer and in winter. The results show that women are more concerned about difficult driving conditions than men, and this is especially true in winter when conditions are the most difficult. Especially older women (> 60 years) find winter conditions difficult and experience insufficient winter operation and winter maintenance. Consequently, better operations and maintenance, particularly during winter, will make walking more attractive and probably increase the amount of walking, particularly among women and elderly.