Innovation in Urban Freight Abstract
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Understanding the interactions between large trucks and non-motorized users in urban areas to improve safety and mobility

As urban areas continue to grow and both passenger and freight traffic volumes increase, it is important to develop a better understanding of the role and impact of goods movement within the transport system. In Norway, similar to many other countries and cities around the world, walking and cycling are being promoted as means to improve sustainability and livability, but often without considering the implications of these measures on the infrastructure and freight mobility. Increasing volumes of cyclists and pedestrians are likely to result in increased interaction between these users and large trucks. This is due to both the increased number of non-motorized users, as well as these increased commercial goods and services, often provided by large trucks, required by growing urban populations. It is important to design urban infrastructure in such a way that reduces the safety conflicts between cyclists and large trucks, while still allowing both groups move efficiently. My research aims to bridge the gap between pedestrian/cycling transport and freight transport by incorporating and integrating existing research, along with performing new studies in order to determine how to better design facilities for all urban road users. Specific areas to be explored include:

- *Qualifying and quantifying the problem*: The number of and severity of crashes are often used as a metric for safety. In addition to identifying and quantifying crashes between the two road user types, it is also important to identify "near collisions." These are unplanned events that did not result in injury or damage, but had the potential to do so. Challenges exist in quantifying these events because they are rarely reported. A methodology, likely using ITS, must be developed to identify and analyze "near collisions" between trucks and vulnerable road users.
- *Developing an understanding of the interactions between these two user groups and the factors which influence these interactions:* Using data and analysis from the first task, it is possible to increase our understanding of the interactions between the user groups, including determining the impact of land use and street designation on appropriate safety measures and determining the impact of designated truck lanes or cycle lanes/sidewalks on crash rates and safety.
- *Developing solutions to improve infrastructure to enhance the safety and efficiency of urban travel for both large trucks and non-motorized users*: Given the high risk conflict points identified previously (bullet 1) and the greater understanding of interactions (bullet 2), it is possible to develop infrastructure improvement suggestions. If common road design aspects at these high risk conflict points can be identified, design improvements can be made. A driving simulator can be used to test infrastructure improvements from the large truck perspective. There is also the potential to modify the simulator to accommodate bicycles, and thus test the improvements from their perspective as well. The expected outcome is a methodology to preemptively identify and improve safety critical infrastructure locations.