

Switching to off-peak delivery times reduces city congestion

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Overnight deliveries reduce daytime congestion. In the Stockholm case, one truck did the work of three, during off peak hours. Credit: KTH Royal Institute of Technology

In some businesses like supermarkets and restaurants, local restrictions on nighttime deliveries leave distributors no choice but to dispatch trucks during morning rush hours. But lifting these rules could reduce peak traffic volumes and increase transport efficiency, according to a recent study involving researchers from KTH Royal Institute of

Technology in Stockholm.

Some communities prohibit heavy trucks from operating during the night. Stockholm is one of them, but the city wanted to test if lifting its ban might yield some benefits in transportation efficiency. Anna Pernestål Brenden, a researcher at KTH's Integrated Transport Research Laboratory, and acoustic, transport efficiency, and policy researchers from the KTH, joined with other partners in a pilot study with the City of Stockholm to see if lifting the 10 to 6 a.m. ban on truck deliveries made sense.

They worked with a national supermarket chain and its suburban Stockholm central warehouse, as well as with a company that supplied food to restaurants and hotels, Pernestål Brenden says.

Ordinarily the supermarket warehouse, which is some 30km north of Stockholm, would deploy several fully-loaded trucks to make deliveries during peak morning rush hours from 6 to 8, because there is no way for one truck to make them all in that short a time span.

But in the study, a single truck delivered goods to three stores in central Stockholm between the prohibited hours of 10 p.m. and 6 a.m. It would return to the warehouse three times in the night to be reloaded, and then make its subsequent [delivery](#), she says. "That's one truck doing the work of three, or in other words – morning commuters are spared having to share the road with three heavy duty trucks."

Though it was a small scale study, Pernestål Brenden says there are strong indications that scaling up off-peak deliveries could increase business efficiency for suppliers and retailers, reduce fuel consumption and CO2 emissions and perhaps make a positive impact on traffic volume during peak morning hours.

But part of the study was also to assess whether deliveries at night bothered neighbors. The drivers had to follow some rules: for example, no using reverse signals or talking on cell phones outside the vehicle. Also, two trucks equipped with low noise technology were used.

"It turned out that the noise people complained about was caused mainly by unloading the truck, not driving," she says. KTH acoustics researchers created a sound recording system that placed microphones in the front and back of the truck. The front microphones would record when the truck was getting unloaded, so that neighborhood background noise could also be taken into account. The system allowed researchers to evaluate the mix of sound from both vehicle and environment and give a true picture of what difference the unloading of the vehicle actually made.

One particularly quiet neighborhood on the edge of the city was the source of complaints from neighbors – but Pernestål Brenden says the results show most people don't notice the unloading in neighborhoods with sufficient background noise. "Only in the quiet neighborhoods does noise raise a problem," she says.

The study also involved truck manufacturers Scania and Volvo, as well as goods owners, carriers, goods receivers, and companies that make silent roller cage. KTH was also asked to validate new technologies, such as a zone management concept for electric hybrid vehicles. Pernestål Brenden explains that this system would automatically switch the engine to electric, rather than diesel, power in certain geographic zones.

She describes the study as a "small step" for more efficient transport. "By making small changes we can improve transport efficiency, reduce congestion, and enable new business models for goods receivers," she says.

Provided by KTH Royal Institute of Technology

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