

SUCCESS STORY

How to become the world's most bike-friendly city

INTEGRATION OF CYCLING INTO THE EXISTING COPENHAGEN TRANSPORT MODEL

PROJECT GOAL

There is hardly any other city in the world that encourages bicycle traffic like Copenhagen. It comes as no surprise that the Danish capital has set itself the goal of becoming the world's most bicycle-friendly city. The city is using a microsimulation in PTV Vissim to assess which measures will help it to turn this vision into reality

RESULTS

After an extensive data collection, the planners are now able to realistically simulate current and future bicycle traffic in Copenhagen using PTV Vissim. Measures such as new infrastructure, green waves, parking areas and increased capacity on heavily used cycle paths can thus be simulated and evaluated in advance.

COPENHAGEN AND THE BICYCLE

It is faster, more practical, healthier and cheaper than the car - the residents of Copenhagen swear by the bicycle. At 650,000, the city already has more bicycles than inhabitants. 52 percent of them use it daily to get to their school or place of work, even if this means going further than the city boundaries. "And it's set to increase even further," says Emil Tin of Copenhagen's Centre for Traffic. Therefore the city wants to continuously expand the bicycle network. This means an addition of 359 km of cycle tracks, 24 km of cycle lanes and 32.5 km of cycle 'expressways'.

"When we're planning traffic, we would also like to be able to know and assess its effects on bicycle traffic in advance," says Emil Tin. "Simulations can help us gain a realistic picture in this respect." Copenhagen has been using PTV Vissim previously to simulate motorized traffic. So it was an obvious step to integrate bicycle traffic into the model in order to be able to work with an all-in-one solution. The city called on consulting group COWI for help with the implementation.

COLLECTING AND VALIDATING DATA

The challenge for COWI was to represent the behavior of cyclists at peak hours in a microsimulation. "There were two key aspects for the success of the project," explains Søren Frost, Traffic Modelling and Simulation Expert at COWI. "Collecting, processing and checking data and then translating the results of the data collection into valid parameters in order to be able to simulate bicycle traffic in PTV Vissim."

PROJECT OVERVIEW

- Project name: Microsimulation of bicycle traffic at peak hours
- Customer: City of Copenhagen
- Main contractor: COWI
- PTV Group's role: software supplier
- Project volume: 70,000 €
- Implementation period: 5 months, May - September 2012



Multimodal modelling par excellence. In PTV Vissim one can adjust several parameters for cyclists, e.g. vehicle characteristics, acceleration distribution, overtaking parameters or behavior at waiting zones

STUDYING BEHAVIOR

In addition to basic parameters such as vehicle characteristics, speed distributions and acceleration behavior, COWI investigated parameters for the cycle path: how can following and overtaking actions be described? What does behavior at narrowed street sections look like? And what about the behavior at bus stops? The consultants considered behavior in waiting zones, at stop lines and right-turning actions in connection with node points.

"In order to be able to determine the parameters, we made observations and video recordings," says Søren Frost. GPS measurements contributed to calibration of speed and acceleration behaviors.

REALISTIC SIMULATION

The careful calibration of Vissim parameters forms the basis for future studies of Copenhagen's bicycle traffic. "This includes questions such as: should cyclists and cars stop at the same stop lines? Or are bike boxes the better alternative?" asks Søren Frost.

Further analyses relate to mixed traffic. This can be considered in great detail with PTV Vissim, since the software allows users to simulate traffic that is not bound to lanes. Regardless of the configuration of the lane marking, PTV Vissim can have vehicles with different widths interact with each other on a single lane and make their way through lateral movements wherever enough space for cutting in is available. In this way, it is possible to represent motorists and cyclists who have to share a road, travel in lanes next to each other or overtake within just one lane. "So it is possible to specify in which streets cyclists and motorists can share the road, and where a separate bicycle lane is a good idea," explains Søren Frost. Emil Tin adds: "Thanks to the model, we can realistically simulate current and future bicycle traffic. Even right-turning on a red light can be represented and the effects on other traffic evaluated."

GREEN LIGHT FOR CYCLISTS

The city is currently working on a green wave for cyclists on Østerbrogade Street. "At the moment there is a green wave here with pretimed signal control," says Emil Tin. "For better harmonization with bus traffic, we would like to switch to an adaptive control system. We use Vissim to simulate the planned measures in order to find the solution that is best for us."

In the "Microsimulation of Cyclists in Peak Hour Traffic" guide, COWI has compiled all information on configuring parameters for bicycle traffic. Interested parties can request this guide free of charge via e-mail from traffic.marketing@ptvgroup.com.