How the City of Breda automates road inspection

Safe roads contribute to the goals of livability and accessibility. Yet roads outside built-up areas are often not very well maintained. Budgets are under pressure and there is a shortage of road inspectors. At the same time, the roads in these rural areas are often used intensively by residents, recreational users, and heavy vehicles such as tractors, agricultural machinery, and trucks. Additionally, the roads are often narrow, so passing each other can be challenging some times. This makes such roads very vulnerable, and as a result, defects occur regularly. Managing this existing road infrastructure outside of the built-up area in the best possible way is a daunting challenge.

The city of Breda recognizes this challenge and puts together a team that researches and explores the possibilities for automating various management tasks. To realize this, the team within the municipality of Breda quickly found **INSPECH**. This new intelligent inspector can detect road damage and make data-driven assessments based on HD video images. The system contains algorithms that automatically classify road sections in accordance with the *Rijkswaterstaat* or *CROW guidelines*. In this way, road authorities receive a detailed damage report and can view their inspected area with all detected damages via the online **INSPECH** portal. As a result, road inspections can be performed better, faster and safer at lower operational costs.

The Dashboard
INSPECH provides a dashboard, so road inspectors are always fully aware of the current status of the road surface. This provides immediate insights into the area, such as pavement condition and road markings. The dashboard automatically displays the type of damage, including the severity classes, the extent, and the geographical coordinates of the damage. With this information, the municipality of Breda can take immediate action to repair the damage to the road surface. With **INSPECH**, Breda can automatically check road surface quality.

The Features
The digital road inspector automatically assesses road sections according to the guidelines of Rijkswaterstaat (Dutch road regulations). The state of the surface is accessible on a digital map where colored road sections automatically mark damages. Inspectors can see exactly which part of the road needs maintenance. This feature also plots specific damage on the map based on orthographic images so that road inspectors can check specific road sections from their computer-based on current photos. The analyses can be automatically linked to international guidelines, such as the Dutch CROW or DWW regulations. As a result, **INSPECH** automatically displays the scores of the official guidelines, allowing for a more proactive maintenance regime. This will allow the city of Breda to solve challenges earlier in the life cycle of the roads. By protecting, preserving, and rejuvenating roads in good condition, damage can be limited significantly. Roads can be prepared for major treatments such as surface dressing. The early intervention treatments are not only cost-effective, but they are also significantly contributing to a greener city (i.e. carbon savings).
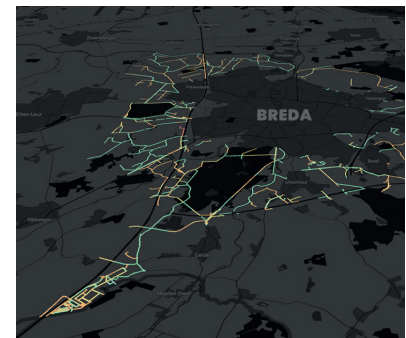
The Future
Currently, we are working on the further development of **INSPECH**. An exciting project is the comparison of inspection results from different periods. Something that fits exceptionally well with a project containing a maintenance component. Additionally, it will be possible to determine road deterioration trends and predict the most appropriate time for maintenance. This way, maintenance is not carried out too early and not too late, so maintenance funds can be used optimally.