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Road Surface Analysis for Smart Cities

Detection of road defects based on high-resolution photos and LiDAR point cloud using state of the art AI technology

Imagine Public Works departments no longer needing to send inspectors to the field to register road and pavement defects. Instead, visualize these inspections being completed with artificial intelligence using high resolution imagery and LiDAR with the ability to note the severity, extent and classification of the individual defects - all from behind a desktop.

Unique collaborations between industry leaders results in unique products

As leaders in their respective industries, Cyclomedia and Arcadis collaborated to launch this new, innovative technology that can mimic the road inspector via artificial intelligence. Cyclomedia provides the high-resolution panorama images and dense LiDAR point clouds. Then, as an innovative expert in the field of road surface analysis (RSA), Arcadis provides the algorithm, which automatically detects road defects, and delivers a road segment data with Pavement Condition Index (PCI) scoring.

Road conditions shape a city's reputation

Roadways are an important means of transportation for residents, the workforce, students, and visitors of cities and counties. Budgets for road maintenance are typically not sufficient enough to create a sustainable road maintenance plan. Many constituents judge their public works department on the quality of their roadways, regardless of the challenges the department must deal with.
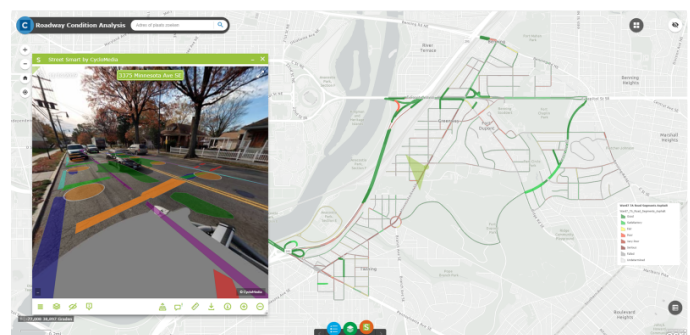
The process to determine the order and priority of which streets will receive a pavement treatment should be based on true data. Cyclomedia's RSA product provides this data and gives the public works department the input needed to visualize the high-level condition of the road network and make data-driven decisions.

Make your budget go farther

The RSA algorithms detect individual road defects, along with their size and severity. The individual defects are used to classify road segments in accordance with the guidelines of the PASER or ASTM methodology. The RSA solution provides direct insight into which road segments will require maintenance soon. In this way, the available budget for road improvement can be smartly allocated to where it makes the greatest impact.

Be Smart City ready: pivot to a preservation approach

With the RSA data, public works departments can move toward a pavement preservation approach in order to prevent the pavement from getting to a condition where major rehabilitation or reconstruction is needed. The pavement life is extended, thus maximizing the value of each dollar spent on the roads. Another important benefit of the this approach is due to the substantially lower treatment cost, it enables the preservation of four to 10 times more streets than if you focused on fixing the bad roads first.

Cyclomedia's imagery provides a detailed analysis of pavement conditions.

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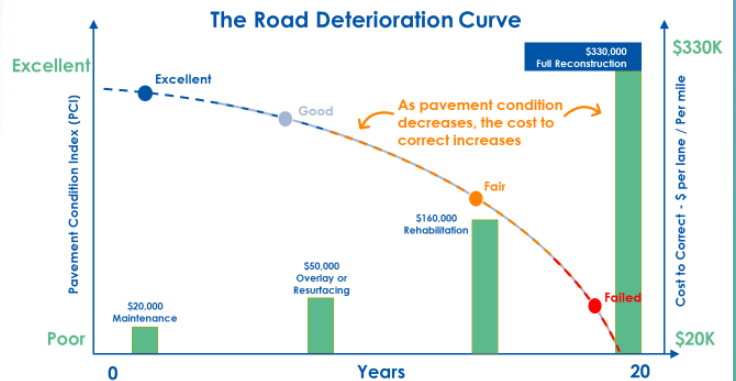
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How to avoid the Road Deterioration Curve

This deterioration curve chart illustrates why it is important to preserve good roads. The curve shows that as pavement ages, the condition decreases, and the cost increase to keep the pavement in a drivable condition.
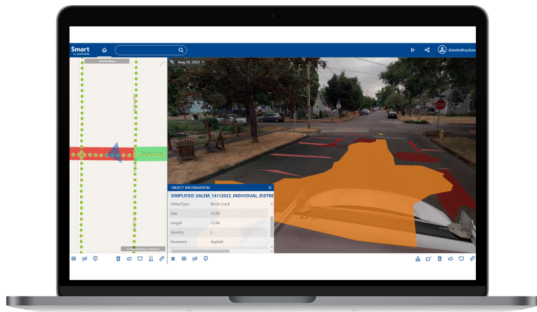
Cyclomedia's RSA product provides the input to start with the preservation approach and improve the overall quality of the roads within the jurisdiction.

The Road Deterioration Curve

As pavement condition decreases, the cost to correct increases

- $20,000 Maintenance
- $50,000 Overlay or Resurfacing
- $160,000 Rehabilitation
- $330,000 Full Reconstruction

Pavement Condition Index (PCI): Excellent — Good — Fair — Failed / Poor

Cost to Correct - $ per lane / Per mile: $330K — $20K

Years: 0 — 20

Benefits of Cyclomedia's Road Surface Analysis technology

Accurate determination of size and position

Cyclomedia's LiDAR point cloud is an extremely detailed 3D representation of the area of interest. This photorealistic data source determines the size and position of a road defect.

Training by experienced road inspectors

Experienced Arcadis road inspectors train and validate the algorithm and bring their in-depth knowledge of road defect classification into the algorithm. This ensures consistently high-quality road-defect observations.

Uniform, objective and constant

The analysis results are always objective and completely uniform, making differences in interpretation of road defects a thing of the past. An annual analysis then results in a good comparison, and historical images.

Mileage limitation

Inspections can be completed right from your desktop, significantly reducing the need for site visits. This increases safety, decreases the assessment timeframe, while moving your organization to a greener approach.

Interested in learning more?
Email Cyclomedia at info-us@cyclomedia.com to schedule a consultation and click the QR code to explore our solutions.

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Real data.
True understanding.
Big impact.