SUCCESS STORY

Making Tunnels Safer - Basler pilot GigE Cameras Reliably Detect Cracks in Tunnels

The tCrack system at work in a Swiss train tunnel

Customer

The engineering company, terra international surveys ltd., is located in Zurich, Switzerland. They have vast experience in civil engineering, hydrography, digital photogrammetry, GPS surveying and cadastral surveying.

Application

In order to assure tunnel safety, tunnels need to be inspected on a regular basis to detect and document defects (cracks, scales, spalls, corrosion, etc.) at an early stage. This has often been done by using traditional procedures such as manual recording from mobile scaffolding. But these methods can only file cracks that have been detected visually by the people inspecting the tunnel surface. This procedure is time-consuming, labor-intensive and subject to a high degree of interpretation. It was time to develop a novel technical solution, an automated and systematic tunnel inspection approach with complete documentation.

Solution and Benefits

In order to economically survey tunnels, terra developed a novel tunnel inspection system called tCrack and the necessary software for evaluating the captured data. It combines digital high-resolution Basler pilot cameras with absolute, kinematic positioning technology. The system is being used successfully in the famous Swiss Gotthard Base Tunnel, and has proven itself to be very reliable in tunnels of up to 25 km in length – it accurately detects, classifies and documents cracks within pre-defined tolerances.

The tCrack system includes ten Basler pilot cameras mounted on a site vehicle such as a locomotive in tracked tunnels or on a cart in tunnels without railway tracks. The vehicle is driven along the center of the tunnel so that the cameras can scan the entire walls and surfaces. All ten cameras capture images simultaneously and are controlled by a central computer which is also mounted on the vehicle. Individual image strips, each covering a tunnel surface...
area of around 10mm width are stored in separate files. The strips are then automatically merged into continuous overlapping images, providing a complete picture of the tunnel condition. The inspection vehicle can travel at around 2.5 km/hour handling and processing the data collected from the ten cameras. This means that the tCrack system can inspect one 10-15-km tunnel per shift.

Gabriele Kadner of terra international explains: “The camera requirements were challenging; they needed to be very reliable, easy to handle and had to deliver excellent image quality. We decided to go with Basler’s 5 MP pilot cameras because they best fitted our requirements. We are very excited to offer such an efficient and reliable system now that takes tunnel safety to a new level.”

terra international’s solution has become the basis for regular tunnel inspections because it collects much more detailed documentation than other technologies, especially manual ones, and increases system reliability. It also reduces the overall time spent in a tunnel, making the inspection task more efficient and cost-effective.

Technologies Used

- 10 Basler pilot GigE cameras per system
- Customized Software Solution – please contact terra international surveys ltd. for more details.

More Information

www.terra-international.com