Leica Viva TS11/TS15 KUMONOS
The remote concrete crack measurement system

- when it has to be right
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Are you still using scaffolds for concrete crack inspections? Valuable time and huge costs are required for crack inspections of hard-to-reach concrete structures. In a strategic partnership, Leica Geosystems and Kansai Construction Survey Company bring together expertise in measurement and crack monitoring technology. Using the KUMONOS system, cracks can be measured from a distance without the need of expensive scaffolding or elevated work platforms.

The world's first built-in crack scale

KUMONOS is the world’s first solution using Leica Viva TS11 & TS15 with a built-in concentric crack scale reticle. Crack widths are calculated from the relation of the distance between the crack and the instrument, and the gauge number that is found by positioning the scale mark over the crack.

Improved measurement accuracy

The KUMONOS system can measure crack widths of 0.3mm, 0.2mm and 0.1mm from the respective distances of 80 meters, 50 meters and 25 meters. This increase in measurable range allows safe and secure crack inspection in places where scaffolding or an elevated work platform used to be required.

Minimum measurable crack width by distance

<table>
<thead>
<tr>
<th>Distance from instrument (m)</th>
<th>1.5</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum measurable width (mm)</td>
<td>0.007</td>
<td>0.022</td>
<td>0.044</td>
<td>0.066</td>
<td>0.088</td>
<td>0.10</td>
<td>0.132</td>
<td>0.155</td>
</tr>
<tr>
<td>Distance from instrument (m)</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Minimum measurable width (mm)</td>
<td>0.177</td>
<td>0.199</td>
<td>0.221</td>
<td>0.265</td>
<td>0.309</td>
<td>0.353</td>
<td>0.397</td>
<td>0.441</td>
</tr>
</tbody>
</table>

This table shows the minimum measurable crack width when the minimum gauge number 0.5 is read. Oblique measurement is also possible with the automatic angle compensation function, but minimum measurable crack width values differ from those in this table.

Applications

- Bridges
- Buildings
- Dams
- Cooling Towers
Fast and accurate digital processing for crack inspections

- **Safe**
  Remote inspection from the ground ensures the safety of the operator.

- **Accurate**
  Leica Viva TS11 & TS15 KUMONOS records all target points with the accurate and reliable PinPoint EDM and quadruple axis compensation.

- **Efficient**
  The KUMONOS office software automatically draws each crack in a CAD drawing.

- **Economical**
  KUMONOS eliminates the need for expensive scaffolding or elevated work platforms.

### Inspection flow

Hand-drawn sketches and CAD tracing are no longer necessary. KUMONOS achieves high-speed digital data processing from inspection to written report.

1. Aim to the crack and measure a distance (reflectorless).
2. Crack widths are measured one by one by aligning the crack scale with the point of the crack to measure the width.
3. Enter number determined with the crack scale into onboard software – true thickness will be calculated and stored with the collected 3D coordinates of the crack.
4. Export data from instrument to KUMONOS office software.

### Automatic creation of CAD drawings using dedicated software

The KUMONOS office software automatically converts acquired measurement data to CAD data and creates plotted drawings.

### Editing of CAD drawings

It is possible to create layers, as well as add crack numbers and crack extensions to the CAD drawing.
Whether you want to stake-out an object on a construction site or you need accurate measurements of a tunnel or a bridge; whether you want to determine the area of a parcel of land or need the position of a power pole or to capture objects for as-built maps – you need reliable and precise data.

Leica Viva combines a wide range of innovative products designed to meet the daily challenges for all positioning tasks. The simple yet powerful and versatile Leica Viva hardware and software innovations are redefining state-of-the-art technology to deliver maximum performance and productivity. Leica Viva gives you the inspiration to make your ambitious visions come true.

When it has to be right.