

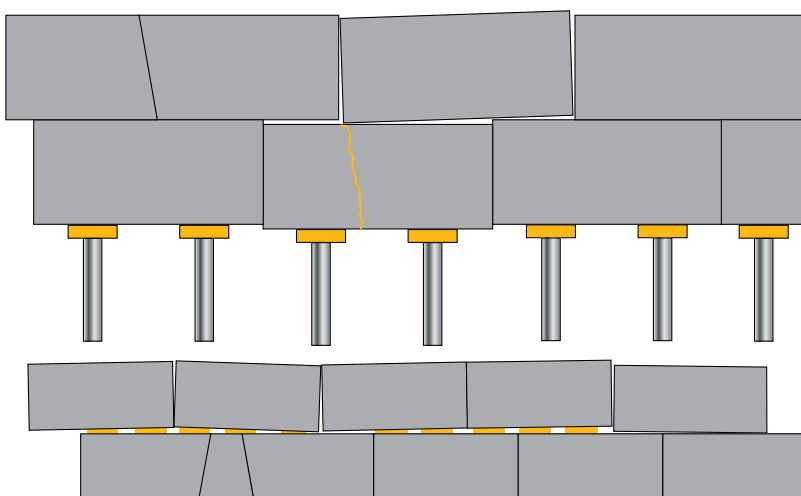
MONITOR Process

When tunnelling is made using concrete segments, there is a risk of damaging the segments by improper ring construction. To avoid this type of damage, the planarity of the leading edge ring is required to be continuously monitored.

TUnIS Ring Planarity Check

While the main rams of a tunnel boring machine press against the concrete segments, extremely high forces are generated causing point loading on the individual segments.

If the leading edge of the first ring is a plane, the forces are transferred in an optimum way thus minimising the probability of segment damage. Planarity is continuously and automatically monitored by the TUnIS Ring Planarity Check, but can also be manually verified at any time.



TUnIS Ring Planarity Check

By observing the thrust cylinder extensions, TUnIS alerts the user, when the ring is supposed to be uneven.

Advantages

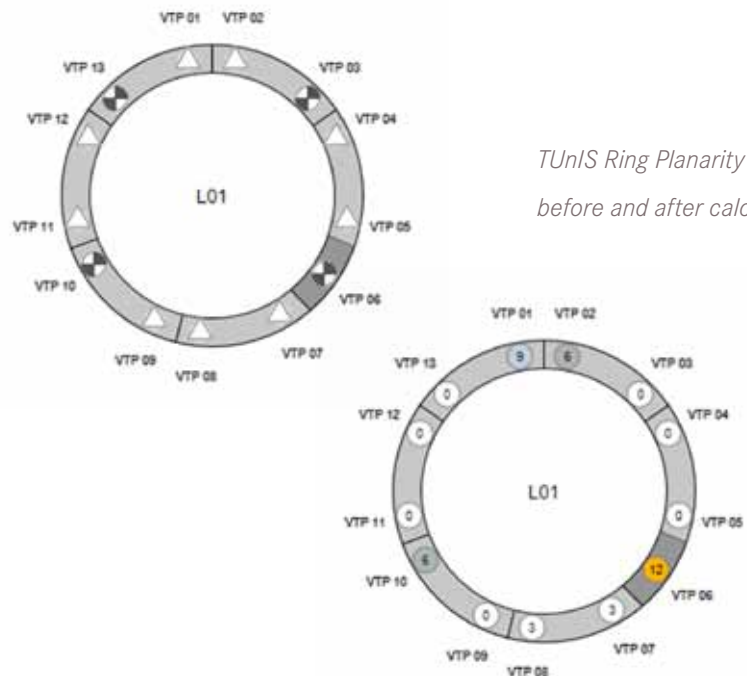
- Ring planarity enables optimum transfer of forces
- Any offset between segments is detected and compensated for
- Less segment damage

Features

- Application: Shield tunnelling including segment placement
- Verification of the leading ring edge for planarity
- Warning in case of suspected unevenness using indication from thrust cylinder extensions
- Calculation of the ring planarity using a cylinder fitted with stroke measurement systems and/or manual measuring points
- Output of packer thicknesses for each measuring point
- Creation of records
- Historical tracking of all ring planarity checks

After automatic warnings are output, the ring planarity can be verified by the system using the thrust cylinders that are fitted with a stroke measurement system and/or using manual measuring points.

By adding manual measuring points to this verification process, the ring planarity can be determined with higher accuracy. The system then uses this higher accuracy to provide suggestions for appropriate ring packers to be applied to the respective measuring points.



TUnIS Ring Planarity Check before and after calculation