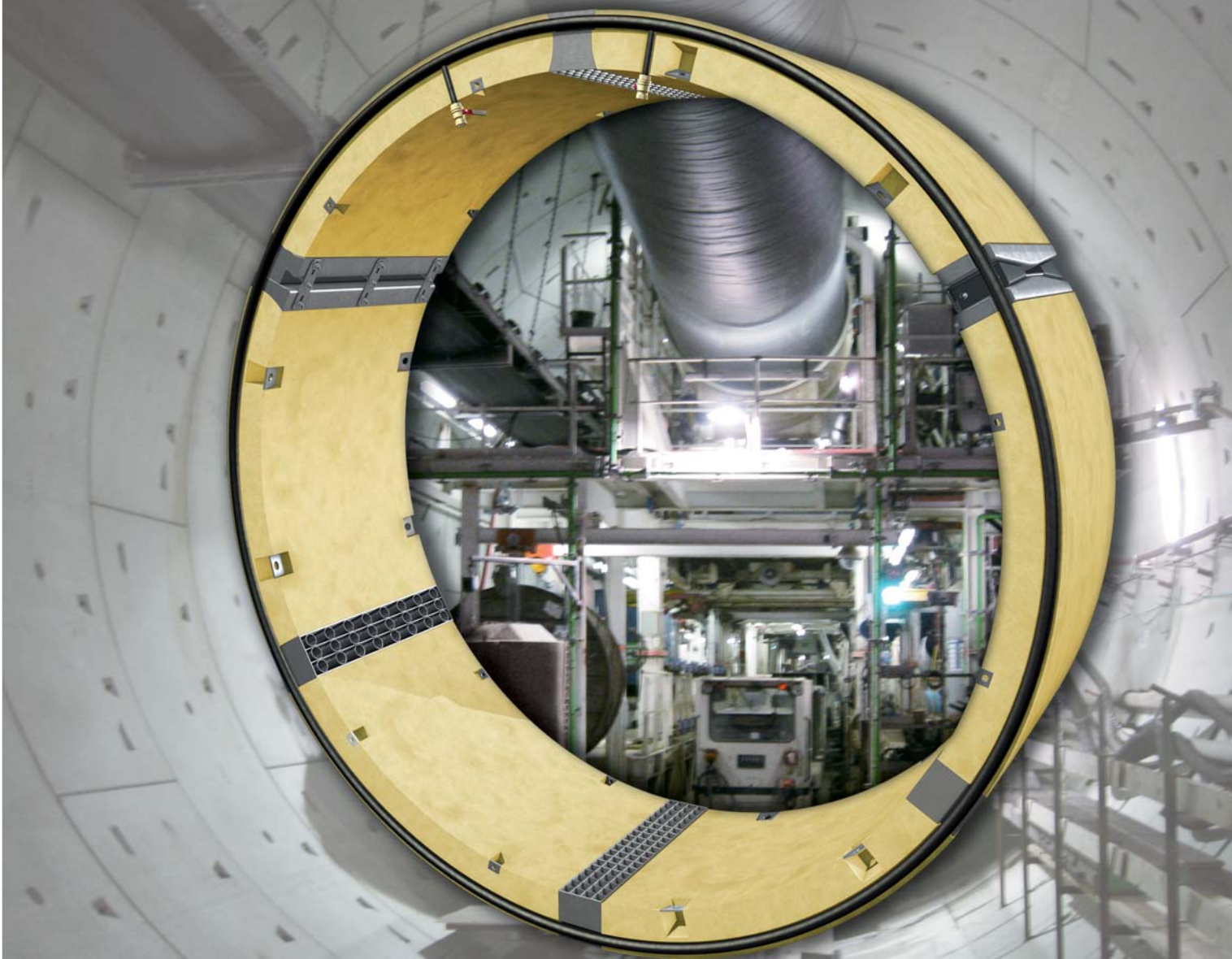


YIELDABLE; ADJUSTABLE TUBBING SUPPORT



For situations with dynamic high pressure, fault areas in rock mass resp. high convergences tubbings need to yield the rock pressure by means of suitable elements.

The yieldable elements' resistivity is designed for absorbing the rock mass impact without destroying tubing's reinforced concrete.

STATE OF TECHNOLOGY:

Today used tubing support in statical rigid version with capstone sufficiently withstands the rock mass pressure by its reinforcement and concrete grade. The tubing rings are for the most part set

behind closed shield headings or as well open TBMs as a finished standing support. Even that system fails at too high rock mass pressures.

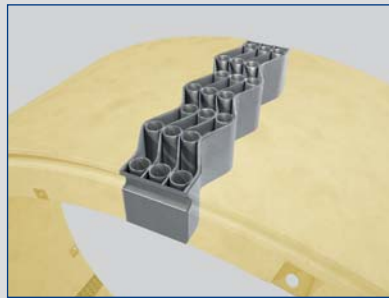
NEW TECHNOLOGY:

For situations with dynamic high pressure, fault areas in rock mass resp. high convergences tubings need to be able to yield the rock mass pressure by means of integrated yield elements and to reduce their perimeter. This happens by designing the

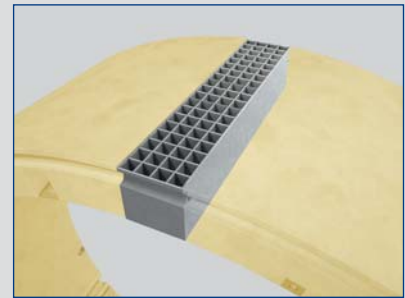
yield elements' resistivity to take the rock mass impact till balanced state before the reinforced concrete is destroyed. Pictures show potential yield elements:



*Yield element
System HONEYCOMB*



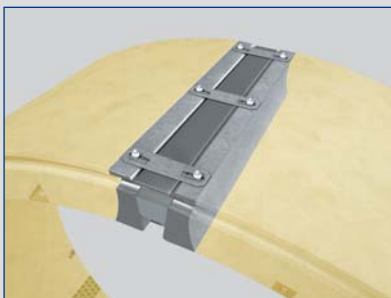
*Yield element
System HONEYCOMB wave form*



*Tapered yield element
for CAPSTONE use*

Contrariwise it may be necessary to increase the diameter while developing the circular tunnel to take higher convergences. Mounting adjustable elements achieves the enlargement of tubing rings - even

at over excavations. As well a reducable tubing ring can be adjusted to the excavation diameter at high rock mass deformation. Pictures show advantageous adjustable elements:



*Adjustable element
System WEDGE*



*Adjustable element
System DOUBLEWEDGE*