

Managing the Crowded Underground



Tolerated chaos in the underground

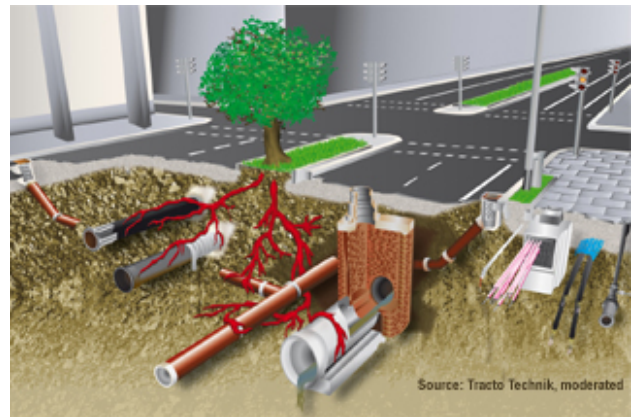
Who is responsible for our streets and roads? Who is entitled to lay pipelines, sewers and cables throughout our cities? Where in general do we find these pipes in the first place? After all, who is responsible for planning, construction and operation of our infrastructure?

Claims for underground space

There are many players claiming space in the underground, all with viable needs (figure 1). In German cities, for example, the supply lines and cables are usually placed under the sidewalks, be it for gas, drinking water, electricity or data transmission. In the middle of the road, in greater depth, we find sanitary and storm water sewers or combined systems. Sometimes the larger supply mains and district heating lines are placed there also. As a consequence pipe trenches serve as foundations for roads and sidewalks. Hence, the soil has to meet many requirements; it's the bedding for the pipe as well as a base for the road. Moreover, the soil may also be used as a substrate for plants. Every tree has roots that need part of the underground space.

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Crowded Underground – soil and in-fill material requirements



The underground space, showing its diverse uses in urban areas

Things are getting tight under our towns and cities! Germany has more than 2.7 million kilometres of supply and disposal cables and conduits installed underground. There are drains, sewers, gas, water and district-heating pipes, plus electricity and telecommunications cables under our streets and pavements.

The use of underground space

We must also add higher requirements for seepage drainage of rainwater, while streetside trees and other vegetation also demand space underground for healthy root and plant growth.

Every utilisation requires corresponding ambient conditions. This is true both of the civil-engineering and horticultural properties of the soils and in-fill materials used, and of the natural functions of the soil. In practice, this can result in overtaxing of the underground, with significant conflicts and development bottlenecks as the consequence. Appropriate solutions are needed both in planning and in civil engineering. Important lines of argumentation and developments for the German-speaking regions are examined below.

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Ten years of the IKT LinerReport: Quality and transparency oblige



Three-point bending test on a CIPP-Liner

The IKT test centre has been publishing annual reports on the results of its CIPP liner tests since 2004. Are CIPP liners

better today? What trends are apparent? And what is the current picture?

There is cause for a small celebration: the IKT now presents its LinerReport, an annual overview of CIPP liner quality, for the tenth time in succession. An excellent occasion, therefore, to chance a look back at the statistics, and assess the developments in the quality of the most important refurbishing method.

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Repair of main drains and sewers



Test apparatus for short-liners and internal sleeves

Operators of waste-water systems at all times aim to achieve their refurbishing targets effectively and at the lowest possible cost. The advantage is with those who judiciously combine the various renovation and repair methods. New measuring systems now permit “before/after” comparisons,

allowing the rational selection and combination of such methods. The necessary preparatory work is frequently neglected during on-site implementation, however. Repair procedures tested by IKT proved to be differinglly immune to such application errors.

There has, in the past, been significant uncertainty on the part of system operators concerning

- what the various repair methods can actually achieve,
- what quality can be attained,
- and what criteria need to be taken into account in tendering procedures, award of contract and on-site supervision.

Repair procedures are used for the rapid, flexible and rational-cost repair of distributed damage, using a large bandwidth of procedures. The same also applies when renovation methods are implemented, since repair procedures are routinely used here for pre-sealing, reprofiling, connection of manholes and the integration of connecting lines. Throughout Germany, around 25 percent of drain/sewer damage is eliminated using specifically “repair” methods.

The independent and impartial IKT – Institute for Underground Infrastructure has already tested repair methods, with the following focuses, in a large range of projects.

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IKT test seal

IKT performs independent and impartial tests and analyses. The results make the overall market more transparent for buyers and users. IKT awards seals, which the manufacturing companies are entitled to use for their PR and advertising activities:



- Products, processes and methods are exhaustively tested in IKT's Comparative Tests. Successful products are awarded a seal that testifies to their good performance.
- The IKT-approved seal is awarded to products, that have passed rigorous testing to meet the needs and requirements of network operators, and whose performance is therefore significantly better than is required in the applicable standards and approval codes.

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Testing of plastic material



DSC analysis of resin samples

The IKT Test Centre provides the following services in its climate-controlled plastics laboratory:

- Materials tests in accordance with the relevant standards
- Quality assurance product tests
- Initial and validation tests of products
- Tests for national technical approvals
- Individually tailored special tests

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