International Research Project: IKT Tests Passive Root Protection Measures in a Globally Unique Experimental Setup

IKT Managing Director Roland W. Waniek (l.) and Leo Bloedjes from the city of Almere, Netherlands inaugurate the test facility and the information board.

Sewers and tree roots—this gets the alarm bells ringing for pipe network operators, because with root ingress, for example into **sewers** is something they are struggling with almost daily. In other networks, such as **district heating**, gas or drinking water, the **roots around pipes** are more problematic, as they can transfer enormous loading during storms, for example. You don’t want roots in the pipe trench and especially within the pipes.
But, you don’t want to start chain sawing the **green infrastructure** of the city. Fortunately, there are **innovative products and processes** that may help keep the roots away from the pipes. Whether they can really do this is currently being

investigated by IKT in an **international project** together with partners from The Netherlands. Passive measures to protect pipes from root ingrowth such as plates, low-porosity backfill materials, mats and special pipe joints are being tested in a **test setup** that is **unique in the world**.

Pipelines and roots: The newly planted trees are part of the test facility which is investigating passive root protection measures.

This open-air test area was set up by IKT in cooperation with IKT Nederland, the city of Almere and the RIONED foundation in The Netherlands. This project investigates how effective **ecologically sustainable concepts** for resolving conflicts between urban green areas and underground pipelines can be.

Watching the roots grow

Five trees have been planted along two sewer pipes in a new development area in the City of Almere, near Amsterdam, whose roots are now under observation, in the truest sense of the word, because glass panes were installed at two points so that you can actually **watch the roots grow**.

Explaining research in an understandable

way

Research made visible: a new information board explains the project, the experimental setup and the goals.

In order for residents and passers-by to understand what the system is all about, an **information board** has been set up to explain the project and its goals in a comprehensible way. **Leo Bloedjes** from the city of Almere, IKT project manager **Mirko Salomon**, IKT Nederland branch manager **Sebastiaan Luimes** and IKT managing director **Roland W. Waniek** inaugurated the experimental set-up and the information board.

24 systems under test

24 systems made of various materials were installed on the sewer pipes and in the pipe trenches of the test facility to provide **passive protection against root ingrowth**. These include special pipe connections, low-pore backfill materials, plates and mats. The **products and processes** that are being evaluated were selected by the client, i.e. they are the systems of particular interest for the city of Almere.

Safe lines under the green city

In this international research project, the **effectiveness of the installed systems** is now being investigated over a period

of several years. The first excavations to examine their performance are planned for Floriade 2022, the International Horticulture Exhibition Expo that takes place in The Netherlands every 10 years, and in 2022 has the Theme **Growing Green Cities**. Almere is hosting the Expo and experimental set-up is near the exhibition grounds and the participants think that this is really a good fit with that theme.

Even before the excavations, the experimental setup provides insights into the subsoil.

After the excavations, the **barrier function** of the systems against growing tree roots will be analysed for the first time. The researchers will then derive initial **recommendations and guidance** from the results, which support network operators in **selecting suitable root protection measures**. In addition, these long-term performance considerations can also provide valuable information for the **development or optimization of products and systems** for root protection of pipes.

Keeping roots and pipelines at a distance

Underpinning this is the fact that underground pipes and the roots of the city trees share the same **ground space** and repeatedly clash. Due to high groundwater levels in Almere, the **space conditions under the roads** are particularly cramped. Underground sewers have to be installed in Almere at depths of

only about one meter below the ground level. In the past, to avoid later root ingrowth where new underground pipelines were being installed, individual trees were felled as a precautionary measure. In times of **climate change**, this is a very unpopular measure, which one absolutely wants to avoid in the future. Therefore, the Gemeente Almere is very interested in **new concepts** that combine a **green city** and optimal **protection of the pipes** against root ingrowth.

Do systems work in the long term?

Sheets, foils, pipe connections, backfilling materials: The test set up contains 24 passive root protection measures.

The aim here is either: to make the **bedding area** of the pipes as **unattractive** as possible **for roots** (low-pore backfill materials); to **direct root growth** into harmless areas (using plates and foils); or to prevent the roots from growing into the pipe (casing pipes and using root-resistant joints). Whether these measures can keep the roots away from the pipes over a long period of time and **effectively prevent roots from growing around or into the pipes** has hardly been researched to date.
With this international research project, the participants want to make a **contribution to a better urban environment**, greener cities and safer sewer operation. And contribute to

better relations—between pipe network owners and tree owners as well as between neighbouring countries.

Where are they going? The first roots from the trees can be seen on the glass panes of the test facility.

And for the people visiting the test facility there is already something to see: The **first roots have appeared** behind the viewing panes.

Web guide

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IKT LinerReport 2018: Has Trend for Improving Quality Ended?

Watertight or not? Water tightness testing in the IKT laboratory

For more than ten years, the performance of CIPP liners continuously improved. But, in recent years the annual test results have sometimes been poorer. Is this a sign of a reversal in that trend?

Fifteen years ago, IKT published its first **LinerReport** and has repeated this exercise every year since. Altogether, these reports include the test results from some 23,000 samples taken from installed **Cured In Place Pipe (CIPP) liners** in sewers. This represents sampling from an estimated 2 to 2.5 million meters of lining installed in rehabilitated sewers.

The **samples** used for the LinerReport are taken at **sewer rehabilitation sites** shortly after the installation of a CIPP lining and are then tested at IKT's two **materials testing laboratories**, in Germany and in The Netherlands (since 2013). **Four test criteria** are applied: modulus of elasticity, flexural strength, wall thickness and water tightness.

2018 results

The latest **IKT LinerReport** includes more than 2,100 liner samples, taken at installation sites in 2018 for **quality control** purposes and examined by the IKT testing laboratories. As in previous years, the modulus of elasticity, bending strength, wall thickness and water tightness were determined for each site sample. In each case performance has been determined by comparing the **test results** with the expected **target values** derived for each sample from the relevant product approval (Germany: DIBt Approval; The Netherlands: KOMO certificate; Switzerland: QUIK guideline) or client information, e.g. static design calculations.

Download LinerReport 2018 here

The average proportion of **passed tests results** for the four test criteria remained at a **high level** in 2018 (mean values: 98.9%; 97.5%; 97.4%; 94.1%), similar to the previous year‘s level, with a very small improvement in the modulus of elasticity and very small declines in the other three criteria. 2018 was a **good year** overall for **liner quality**.

Samples passing all four test criteria

Wall thickness measurement: requires particularly high precision

For about two thirds of the liner samples tested by the IKT testing laboratories in 2018, required **target values** for all four criteria were available. Only if all four target values are known, can a complete **evaluation** of the sample against all criteria be made. At least one target value was missing for one third of the samples. Of the total of 1,366 samples with all four nominal values, 90% met the requirement for all four test criteria. So, one tenth failed at least one test criterion.

Members of the “100% Club“

Five lining companies managed to achieve a **100% pass** for all four test criteria with all their samples in 2018. They are:

- **Bluelight GmbH** with PAA-F-Liner
- **Hamers Leidingtechniek B.V.** with Alphaliner
- **ISS Kanal Services AG** with Alphaliner
- **Jeschke Umwelttechnik GmbH** with Alphaliner
- **Kanaltechnik Agricola GmbH** with Brandenburger Liner

Conclusions: Preventing loss of quality

The IKT LinerReport has been reflecting the **development of quality assurance** for CIPP sewer lining since 2003/04. Looking back over the last 15 years, we can see a clear trend of **improving quality**, over about a decade until 2013/15, before stabilising. Since 2015, there has been a slight **tendency for a decline in performance** against the mechanical test criteria. Has the long-term improvement in CIPP sewer lining quality assurance ended?

A sign of declining quality assurance?

Three-point bending test: mechanical testing of modulus of elasticity and bending strength

This claim seems premature at this time. However, the slightly declining average test results of the last three to four years indicate that it is not a given that a **high level of quality** can be maintained once it has been achieved. This could be interpreted as a sign of a **possible reversal in the trend**. There could be several reasons for this: an intensive struggle by the lining companies for market share in a market that is still very price-competitive, the development of new machinery and plant capacities, the entry of new market participants and, last but not least, the much-discussed shortage of skilled workers, which is particularly noticeable in the commercial sector. Much of this is speculative, so it remains to be seen how the markets develop.

Sewer network owners must ensure quality assurance

In order to maintain a high level of **CIPP liner quality**, customers should make it clear to suppliers that **quality is important** to them and that they take the requirements of the relevant standards and regulations very seriously. In their function as network owners, they should commission **independent testing** themselves and insist on consequences in the event of negative test results.

Clients should make sure that they have CIPP liner

installation checked so that there are **no quality loopholes**, which can prove to be very expensive in later years. Finally, they should pay much more attention to **acceptance warranties**, because then they will still have some control in the event of inadequate renovation work.

Download LinerReport 2018 here

View all IKT-LinerReports

IKT Test Centre for CIPP liners

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IKT’s Roland W. Waniek Celebrates 20th Job Anniversary

A big thank you for Roland W. Waniek, a big cake for everyone.

Today, **Roland W. Waniek**, Managing Director of IKT, celebrated his **20th job anniversary** with IKT. He said: “These have been 20 exciting and intensive years. I would like to thank all employees and the Board Members for such good and successful collaboration over that time! And I look forward with **confidence** to the future.” Then he cut the cake.
Prof. Dr.-Ing. **Bert Bosseler**, IKT’s Scientific Director, who worked with Roland for the past 18 years, thanked him and praised his commitment and foresight. For IKT’s Supervisory Board, **Hans-Joachim Bihs** delivered greetings and a bouquet of flowers.

Prof. Bert Bosseler (left) thanks Roland W. Waniek for the good cooperation.

Hans-Joachim Bihs (left) congratulates Roland on behalf of IKT’s

After 20 years of service Roland finally cuts the cake.

Supervisory
Board.

New Heavy Rain Testing Facility: Environment Minister Hands over Funding Decision for More than 9 Million Euro

North Rhine-Westphalia's Environment Minister Ursula Heinen Esser presents the million-Euro funding decision.

IKT is building a **globally unique test facility** for heavy rainfall and urban flooding. The project, which costs around 11 million euros, is funded from the EU's and North Rhine-Westphalia's joint Fund for Research Infrastructures. NRW **Environment Minister** Ursula Heinen-Esser now visited IKT and presented the **million-dollar funding decision**. Overall

objective: Preventing flooding from local heavy rainfall and protecting people and buildings.

More frequent heavy rainfall

There has been **more heavy rain** in recent years than ever before. Heavy rains in Wuppertal, Münster, Dortmund and numerous other cities have been bad experiences. They led to **catastrophic local flooding** with extensive damage to private and public buildings. Even people were harmed.

More and more frequent, local heavy rainfall events cause enormous damage. IKT is researching the rainproof design of our cities.

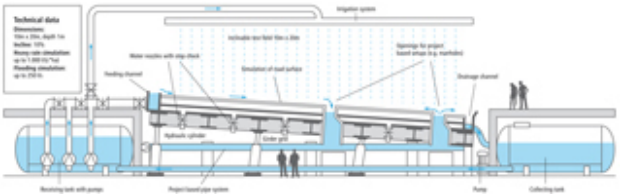
IKT Managing Director Roland W. Waniek: “Our research question is: How can **damage** caused by heavy rain be **mitigated** or even **prevented** in the future? The existing sewer systems are not designed for these water masses, for justified reasons. Therefore, **new approaches**, new techniques and new urban planning concepts are needed.”

Computer simulation is not enough

Because of the **complex urban conditions** and mixtures, especially in the inner cities, it is very difficult to develop solutions on the computer alone. The dynamics of rainwater and its **flow behaviour** in urban areas quickly push

even the best simulation models to their limits.

New test rig on a scale of 1:1



Scale of 1:1: The new testing facility will be able to simulate heavy rainfall and flooding.

For this reason, IKT has designed a **new test rig** which simulates realistically on a **scale of 1:1** how rainwater flows off roads, residential and commercial areas. The new facility will enable IKT researchers to **replicate entire road sections**, including all the associated installations such as kerbstones, gutters, gullies, manholes and pipes as well as state-of-the-art **rainwater retention equipment**. Even road gradients of up to 10 percent can be created.

Water from below, from above and from the side

More than 9 million Euro of funding – two third from the EU, one third from the country

of North Rhine-Westphalia.

The experimental setups will then be **exposed to heavy rain masses** of 1,000 litres per second and hectare. This could be used to flood a football pitch ankle-deep in a good quarter of an hour. In addition, large-scale **flooding of streets** and squares can be simulated with a water surge of **250 litres per second**. This could fill two bathtubs in one second.
In a water cycle driven by powerful pumps, **flooding can be simulated** again and again to observe the behaviour and performance of the road and drainage system and its **protective effect** on people and property.

Results for on-site practice

Local authorities will profit from IKT's research results.

The research results from IKT will allow conclusions to be drawn for the future **rainproof design** of roads, footpaths, cycle paths and underpasses. It will also show how buildings can be better protected. Above all, the Institute aims to provide local authorities with **practical insights** that can be used in a targeted manner on site. Also the environmental regulators can see which technical regulations and legal requirements make sense and which may need to be changed.

International Heavy Rain Research

The new IKT test facility will also have a **control station**

with which measurement data and video images of the tests can be **visualised in real time** and transmitted via the Internet. This will enable scientists worldwide to observe and comment on the **experiments** being carried out in Gelsenkirchen. **Research** on heavy rainfall and urban flooding will be **internationalised**, as heavy rainfall does not only exist in Germany.

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IKT Compare: Can Short Liners Repair House Connections?

How do short liners perform? IKT figured it out in its latest IKT Compare project.

Short liners are often the first choice for **repairing local damage** in house connections. But, can they deal with **seriously damaged pipes**? The results of the new **IKT-Compare project**

“Short Liner for House Connections” are now available.
IKT institute has found in its most recent IKT-Compare project that in principle short liners (also referred to as patch or point repairs) can make **good quality repairs** to house connection pipes, even when the pipe is **severely damaged**. Eight short liner systems were tested and achieved scores ranging from **“VERY GOOD”** to **“SATISFACTORY”**. The evaluation did find significant **differences in performance** between the systems that were examined.

Twinbond Liner was the best performer with a score of **VERY GOOD (1.2)**. Second place went to **epros DrainPacker** (Trelleborg) also graded **VERY GOOD (1.4)**. Bodenbender Point-Liner-System (1.7), Berolina Repair System (2.5), Cosmic TopHat system (2.5) and MC Konudur LM-Liner (2.5) each received a GOOD grade. Alocit short liner (2.7) and I.S.T. Spot Repair System (2.9) were graded SATISFACTORY.

The project has been undertaken in co-operation with **twelve sewer network operators** which wanted to understand the **strengths and weaknesses** of this widely used technology. It has been **funded** by the North Rhine-Westphalian **Ministry of the Environment** and the **network operators**.

Download table of results
Download product test report (German)

Tough testing of short liners

Deliberate defects: IKT has installed eight test sections with a total of 64 cases of damages in its large test pit.

A rehabilitation using a short liner should be able to restore the **structural stability** of a pipe, secure its **hydraulic performance** and **seal a damaged area**. For this reason, the IKT Compare team and the network operators involved placed particular emphasis during testing on the **water tightness**, **operational reliability** and **structural stability** of the rehabilitation. The particular focus was **resilience external water pressure**.

Test set-up damage scenarios

For this project IKT built eight identical **1:1 scale rigs**, in its large-scale test pit (15m by 6m by 6m), into which suppliers installed their short liners. Each rig comprised a length of sewer to which were attached one **house connection pipe** on the same level as the sewer pipe and two house connection pipes from a higher level. The house connection pipes were prepared with **defined areas of damage**, including milled patterns of **cracks**, the removal of some or all of the **joint seals** and **broken sections**. A total of **64 damage patterns** were produced – eight in each of the eight test rig setups.

Two up, one down: the test set-up.

These **patterns of damage** were arranged as follows:

- **Test Setup I** (the lower house connection pipe, to which a 2m head of external groundwater was subsequently applied): cracks, a broken joint, a radially displaced joint and a joint displaced at an angle
- **Test Setup II** (the two higher house connection pipes, to which a 1m head of groundwater pressure was subsequently applied): a defective change of pipe material, defective change of pipe diameter and material from cast iron DN 150 to PVC DN 125, a defective change of pipe diameter and material from clay pipe DN 150 to PVC DN 125, and a break in the joint of a 45 degree bend

Following **installation** of the eight different short liner systems into separate test rigs, an **extensive testing programme** began, starting with initial **visual inspection** and **leak tests**. This was followed by short-term and long-term **external water pressure tests**, **high-pressure jetting** at different pressures and using different types of nozzle, simulated **backing-up of water**, **changing groundwater levels**, and **cleaning** with rodding devices.

Frequent visual inspections and leak tests were undertaken as the programme progressed. Finally, when the test rigs were exhumed from the test-pit, the **cross-section reduction** was measured and the **adhesive tensile strength** and **ring stiffness** of the installed liners were assessed.

Grading of performance

In-situ tests: lab tests were validated through in-situ observation of the same systems being installed at actual construction sites.

In addition to physical tests, the **QA/QC procedures** were examined. The laboratory results were validated through **in-situ observation** of the same systems being installed at actual construction sites. The **final scores** in this IKT Compare test are based on these three evaluations. The **range of grades** applied is from VERY GOOD (score of 1.0) to INSUFFICIENT (score of 6.0).

Weighting of scores: Water Tightness counts for the most

To derive the final scores the results of the **1:1 scale testing system tests** were given a **85% weighting** and the results of the **QA/QC** evaluation **15%**. For the 1:1 scale test score, the three test criteria were weighted as follows: “water tightness” (60 percent), “operational reliability” (20 percent) and “structural stability” (20 percent).

Ongoing observation. IKT testers regularly check the installed short liners for leaks.

The assessment of QA/QC comprised **five criteria**: the installation manual, the available training courses, the system's DIBt (German Government's approval body) approval, external production monitoring, and a comparison between the installations observed in the laboratory and in the field. The results for each criteria were given a 20% weighting in the final QA/QC score.
In addition to the test criteria used to derive the comparative scores of the systems, **supplementary information** was collected and presented that would be of interest to the end user. These include results from **internal pressure tests** undertaken after the rigs were excavated and the **adhesive tensile strengths** of the liner bonding to the host pipe. The **preparatory measures** undertaken by the installer, such as initial inspection, substrate preparation and cleaning, were documented. Also presented are: the number of on-site working days, the number of installation staff, the time required for preparatory work and installation, and the costs.

The Steering Committee – twelve cities

Members of the Steering Committee for the IKT Compare project "Short Liner for House Connections" are the following German **cities**: Billerbeck, Burscheid, Dortmund, Duisburg, Düsseldorf, Gelsenkirchen, Göttingen, Hagen, Herne, Rheda-Wiedenbrück,

Schwerte, and Arnhem from the Netherlands.

What the systems can do

Repair objective: to seal damaged house connections.

In this IKT Compare project, the system suppliers demonstrated that **serious damage** to house connections can be **reliably sealed** using short liners, including breaks, cracks, misalignments and deflections. In particular, the **Twinbond** and **Trelleborg** systems proved to be the **most reliable** under permanent groundwater load, jetting, simulated backflow events and changing groundwater levels. For this they were deservedly awarded the **score of 1.0** for water tightness.

Special Challenges

In principle, it was also shown to be **possible to seal** the changes in nominal diameter and pipe material in **Test Setup II**. However, four of the systems came up against their **performance limits** here, showing weak points, which led to **infiltration**. In one case, gushing water was visible immediately after installation. Therefore, changes in diameter and material require **special attention** during installation.

Results of Test Setup I

All eight short liners showed **very good** to **satisfactory**

results for the four damage patterns in **Test Setup I**: cracks, broken joint, radially displaced joint and joint displaced at an angle. **No infiltration** was observed during the whole test period. However, about half of the systems showed **visual abnormalities** in the form of moisture and/or discoloration at some locations, but without the formation of droplets.

Structural stability assured

Adhesion test

The structural stability testing of the short liners showed that they basically have **reliable adhesive and load-bearing performance**. For products with full-surface bonding of the liner to the host pipe, hardly any abnormalities were observed, i.e. no crack formation, no excessive deformation, no stability failure nor large-surface loosening of the adhesive bond. Five systems showed **partial loosening** of the adhesive bond at points of changing diameter or pipe material, albeit without any consequences.
The Cosmic system is not intended to bond over the full-surface, only at the start and end of the liner. However, the supplier was able to submit a **static proof** which confirmed the structural stability of the short liner observed in the test.

Operational activities

High-pressure jetting did not affect the short liners.

The test scenarios **simulating sewer operation**, such as high-pressure jetting, water backing-up in the pipe, and changing groundwater levels, had **no significant effects** on system performances.

Good QA/QC

There were **no issues** with quality assurance: seven out of the eight systems fulfil all the criteria for quality assurance and receive a grade of 1.0. The Cosmic system does not have a DIBt approval and so gets a grade of 2.0.

Conclusion

In conclusion the IKT Compare project “Short Liners for House Connections” has demonstrated that **short liners can renovate even severely damaged sewer pipes**. However, changes in diameter and material require special attention during installation as they might cause serious problems. It is important to select the **right system for the task**, to understand the limitations of individual systems, and apply the necessary QA/QC before, during, and after installation.

Download table of results
Download product test report (German)

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IKT Compare: How good are products really?

Defined damages: preparing the test rigs

The objective of IKT Compare projects is to provide network operators with **reliable, neutral, and independent information** on the strengths and weaknesses of products and methods in sewer technology. IKT Compare projects are always undertaken **in collaboration with network operators**. Their representatives form a **steering committee** which takes all important decisions on how to test the products.
At the core are **tests under realistic service life conditions** such as traffic and ground loads, groundwater pressure and high-pressure jetting.
Each IKT Compare project is accompanied by a steering committee set up of network operators. The committee meets regularly and takes decisions on:

- products to be tested
- scope of the test programme
- test criteria

- test set-up
- final grading and assessment of the test results

The actual testing and documentation of the results are carried out by IKT, as a neutral and independent institute. As a result, network operators are provided with **independent, practice-related, and technically well-founded information** on the strengths and weaknesses of products, their applications and limits.

On the Starting Block: Major New IKT Product Test on “Liquid Soils”

What are liquid soils capable of? Let’s find out together – in IKT’s new “Liquid soils” product test

What can, and can’t **liquid soils** be used for? When is it feasible to use liquid soils? Which liquid-soil **methodologies**

deliver convincing performance? How can you **save money and time** using liquid soils? All these issues will be investigated in **IKT's major new "Liquid soils" product test**, which is now on the starting block. Interested **wastewater network operators** are invited to **participate** : to be there right from the start, **contribute** to the design of the project and be the first to **benefit** from the results.

Comparative testing

The two-year **"Liquid soils" product test** is intended to provide wastewater network operators with important information on the **selection of products** and methods. It will generate reliable, impartial, independent **information** on (boundary) conditions for the use of liquid soils, make **recommendation**s for tendering procedures, identify on-site implementation procedures and set out how to apply **quality assurance**.

Backfilling of pipe trenches using liquid soils offers advantages. But what are the important factors for

preformance?

TFSBs – liquid soils

The use of “temporarily flowable, self-compacting backfilling materials” (TFSBs) offers wastewater network operators the potential to **optimise pipe bedding** and reinstatement for both new lay and the renewal of existing systems. The quality of the bedding achieved using liquid soils may have beneficial effects on the **cost-efficiency** of a sewer project, on the **load-bearing performance** of the installed pipes, on their interaction with the surrounding ground and on **service-life** of the system.

However, to date, sewer network operators have only used liquid soils in isolated cases. There is a lack of clarity concerning evaluation of the **implementation risks** and, in the past, the selection of bedding material has been made primarily on the basis of information provided by manufacturers and from subjective experience. The **lack of quality specifications** and the differing information provided in codes, standards and application guidelines has also caused uncertainties during the tendering and award procedures. There are, at present, no independent methods for checking of the quality of materials under various practical conditions.

Market survey, test results, specimen STCCs

Well bedded, longer service-life

IKT’s “Liquid soils” product test will supply a wide range of **information** and practical based **assistance** on the subject of TFSBs: a detailed **market survey**, impartial test results, and useful **specimen supplementary technical contractual conditions** (STCCs). Those participating in this research project will firstly work with IKT to identify and compile **quality requirements** for liquid soils, produce a **product requirements document** and derive from this a **programme of tests** using standardised test criteria and boundary conditions. Selected, commercially available liquid soil products will then be **comparatively tested and analysed** for their properties, performance, and installation risks; both under repeatable conditions in the laboratory and also in situ on construction sites.

Interested network operators are needed!

Technische Werke Burscheid (Burscheid Technical Utilities), in cooperation with the IKT, submitted a funding application for this project, which the State of North Rhine-Westphalia has now been approved. The federal state will bear 80 percent of the project costs. Other **system operators** willing to contribute both subject matter and financial contributions to the project are, of course, also very welcome to join the **project steering committee** and leverage their contribution.

I expect from the IKT product test a profound insight into the subject of TFSBs and many practically relevant results for the aware use of liquid soils. In future, we will benefit from savings on sewer operation and from longer service-lives for our sewers. Get involved, and benefit from this intensive interchange and the joint work in the steering committee!

Dipl.-Ing. Frank W. Grauvogel, Technische Werke Burscheid, Head of System Operation, Development, Sewer and Highway Construction

The members of the **steering committee** for this product test will directly influence the project scope and the test programme. They will also benefit directly from the **exchange of knowledge** and experience with other network operators. The product test project will include a **market survey**, development of **supplementary technical contractual conditions** (STCCs) and notes for practical on-site implementation of liquid soil methods. The **potential applications** for the methods tested will be determined, and qualified statements provided on the technical performance of liquid soils on the basis of a standardised, well-founded product requirements document and testing concept.

The IKT product test will analyse quality of procedures under laboratory conditions and in situ on construction sites

The **benefits** for the participating network operators will be numerous and diverse:

- A **qualified market survey** of temporarily flowable self-compacting backfill materials (TFSBs), complete with information on product features and application limitations
- A standardised and well-founded **product requirements document** for TFSBs, incorporating quality assurance requirements with respect to installation, operation, removal and disposal
- Well-founded information concerning the **scope of application** and qualified statements concerning the **technical performance** of the products and methods examined
- Useful notes for the inclusion of **specific input parameters for pipe structural analysis** for the use of

liquid soils (Design Concept for Pipes in Liquid Soils, with reference to DWA-A 127)

- Basic information concerning on-site **implementation of "standard procedures"**
- **Impartial, independent product recommendations** concerning the TFSBs available on the market
- **Supplementary technical contractual conditions** (STCCs), complete with specific notes on quality assurance and recommendations for tendering, award and supervision of construction work
- Direct **expansion of available knowledge** via involvement in the test programme, requirement profile and interchange of experience with other network operators through participation in steering committee meetings

IKT product tests

IKT's comparative product testing projects test products and methods to the limit under laboratory and practical conditions. Every product test is supported by a group of network operators. The members of these groups – referred to as "steering committees" – benefit directly from insights into the testing and methodological procedures and from technical exchange with other network operators.

Test subject matter, procedures and criteria are defined by the respective steering committee. Decisions concerning the final evaluations are also taken jointly by the network operators in these supervisory bodies. This ensures that the tests are performed on a strong practical basis, impartially, and without any influence from commercial interests.

The aim

The results provide the network operators with well-founded, dependable information on the strengths and weaknesses of the products and procedures available on the market. This then enables them to base their purchasing decisions on solid facts, rather than solely on the manufacturers' advertising. IKT's product tests at the same time provide the various

suppliers with indications for the improvement of the products and procedures tested, and thus also for the strengthening of their market position. Ultimately, these are all benefits for the entire industry.
To the IKT Product Test results

Generating knowledge

In two years, we will, jointly, have attained greater **knowledge on liquid soils** and generated greater certainty and reliability in their use. What we need now is **your support**, as a network operator, for IKT's longest and largest product test to date.

Support us! Get involved! Get the benefits!

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