

# IBAK

Made in Germany

All IBAK products have one thing in common: They are „Made in Germany.“ All system components are developed, produced, assembled and tested by IBAK. Thanks to their high quality standards, IBAK products have set the standards for investment security and economic efficiency – for more than 60 years.

**IBAK** Helmut Hunger GmbH & Co. KG  
Wehdenweg 122 | 24148 Kiel | Germany  
Tel. +49 (0) 431 7270-0  
Fax +49 (0) 431 7270-270



### The New LISY

#### (IBAK Satellite Inspection System):

The new LISY (version 3.2) with its improved push rod drive system permits very performance-oriented and effective working procedures.

In addition, it can hold various flushing hoses and IBAK push rods and, depending on the requirements, the customer can choose between a Magic Push Rod or a Perfect Push Rod for his satellite inspection system. Whereas in the past it was only possible to use a Magic Push Rod, a Perfect Push Rod can now also be used. Because of its small diameter, this push rod has a light weight and its stability guarantees a long range. At the same time, it has 90 degree bend-passing capability. Furthermore, with the new LISY, the propulsion speed is infinitely variable and freely selectable.

The new observation camera LISYCam 200 now enables mainline sewers with small diameters (from DN 200 upwards) to be negotiated without any problem by the LISY and laterals to be inspected from these with excellent visibility. The LISYCam 3 is used as usual in DN 150 pipes.

In diameters of less than DN 150, inspections are still performed without using a satellite inspection unit, just by flushing the camera through.



### 3D-GeoSense

#### (without Flushing Drive) with the New LISY and a Perfect Push Rod on the LISY Synchron

With the IBAK LISY 3 system for lateral inspection (satellite system and calibrated ORION with the Kiel Rod guide device or POLARIS as the case may be), the inspection and the pipe run survey are performed in one single operation.

The system permits the inspection of laterals from DN 100 upwards from mainline sewers. The system is driven by flushing or, as is now the case with the new LISY generation, also simply by using the push rod of the LISY system.

With the flushing alternative, the pump, the hose and the nozzle are optimally suited to each other so that, together with the very light camera, it is possible to flush the system a long way without using very much water.

However, if you want to perform the survey with a conventional satellite system without a flushing unit, this is also possible. The new LISY with its improved drive system for the push rod (Perfect Push Rod) permits very performance-oriented and effective working procedures.

The IBAK pipe run survey system uses a very small, precisely precalibrated sensor installed in the camera (ORION 2.8L D,

ORION 2.9 3D, POLARIS 3D). The integrated sensor is particularly small and space-saving and is calibrated ingeniously before use. This calibration and a compensation procedure to eliminate clear systematic sensor errors contribute to ensuring a most precise display of the run of the lateral network.

The gradual generation of the lateral network can be observed in real time on the monitor.

The operator can choose whether the pipe run is to be surveyed when the system is moving forwards or in reverse.

### 3D-GeoSense Compact Push Rod System

As it is now possible to perform a pipe run survey in push rod operation, a compact, portable system can be used.

The system consists of a coiler with a push rod, a control box\* and a camera with a camera guide device.

The precalibrated camera (ORION 2.8L 3D, ORION 2.9 3D, POLARIS 3D) with an integrated 3D sensor is connected to a push rod. The DEIMOS 3D camera guide device ensures that the camera is stabilized during the survey of the pipe. During the inspection in push rod operation, the measured data (xyz coordinates) from the 3D sensor are collected fully automatically. This is done in a single operation together with the TV inspection.

The coiler HSP 60 holds 80 m of push rod (Perfect Push Rod). Length data are transmitted directly to the software by means of the counter installed on the coiler.

The new control box (version BK 3.5.2) with an improved 12" daylight-capable video TFT colour monitor, a new SD recorder\*\* and a PC module permits the xyz coordinates to be recorded, provided that the IKAS evolution software

is used. With IKAS evolution, real-time display of the surveyed pipe run as a network graphic is also possible during the TV inspection.

This 3D-GeoSense compact system also provides a complete, efficient pipe run survey system that is easy to transport and which surveys the pipe run at the same time as the inspection with only slightly higher time and cost requirements and displays this as a graphic.

\* With a PC module and IKAS evolution software  
\*\* The new recorder records in high resolution and is available as an option

### 3D-GeoSense Pipe Run Surveying in Mainline Sewers

To survey the pipe run in mainline sewers, all that is required is a conventional IBAK system equipped with the corresponding IBAK software and a camera with a precalibrated sensor (ORION 2.8L, ORION 2.9, POLARIS 3D). During the inspection of the collector, the xyz coordinates can be determined in this way without any additional effort and the actual pipe run can be displayed in the plan.

### POLARIS 3D

The POLARIS push rod camera was developed by IBAK in order to satisfy the demand for a bend-capable camera that can change direction by 90° with a 100% field of view. This pan and rotate camera can be used in DN 100 pipes upwards. Because the camera is positioned right at the front, no guide device can be seen in the picture during the inspection.



The POLARIS is compatible with the IBAK LISY satellite system, the mobile push rod systems MiniLite and MobiLite and the 3D-GeoSense compact push rod system with a control box.

The camera can rotate automatically (360°) to inspect pipe joints. Two preselectable focus memory points facilitate in particular the joint inspection function so the user gets along faster as frequent refocussing is no longer required.

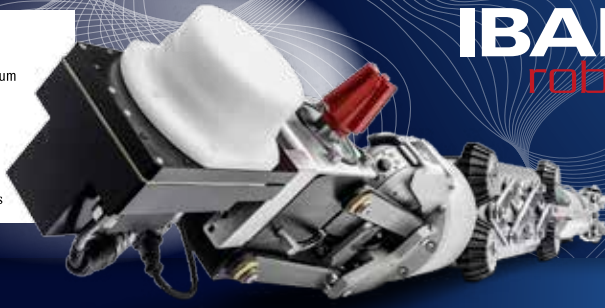
Finally, the sensor already contained in the ORION 2.8L and the ORION 2.9 has also been integrated into the POLARIS, so that the calibrated version POLARIS 3D is now likewise an important part of the 3D-GeoSense pipe run survey system.



Gefördert durch:  
 Bundesministerium für Wirtschaft und Energie  
 aufgrund eines Beschlusses des Deutschen Bundestages

**IBAK**  
robotics

**IBAK**



## NANO

The new NANO pan and rotate camera is the smallest pan and rotate camera in the IBAK product range and is, as it were, the little sister of ORION and POLARIS. It can be used in pipes as small as DN 80.

Each desired viewing direction is reached extremely rapidly under microprocessor control by the pan and rotate head.

The NANO can rotate endlessly around its own axis. The pan function permits a view in all directions through to automatic rotation to inspect pipe joints and a view to the rear into laterals. The NANO generates an upright image in axial view thanks to the UPC function (upright picture control). With its slim diameter of 47 mm the camera can be connected to all IBAK push rod systems and has full bend passing capability.



## MicroGator System

The new MicroGator cutting and grinding system, that, like previous IBAK Robotics systems, runs solely on electricity, will be on show to the public for the first time at the RO-KA-TECH exhibition.

Apart from having the well-known advantages of electric cutting and grinding such as low operating costs, a high degree of efficiency, low noise emission and good environmental compatibility, the newly designed cutting and grinding robot is distinctly smaller than its predecessors. The IBAK Robotics MicroGator makes it possible to work in rehabilitated DN200 pipes without any problems. Due to its specialized structure, the cutting and grinding robot can now be introduced easily even in the case of small manhole-mainline sewer configurations.

Thanks to an improved linkage on its head, the cutting and grinding robot also reaches areas that are deeper down the lateral.

The proven technology of purely electrically driven cutting and grinding has been further improved. Thus, an even more powerful motor that permits very efficient working procedures is used.

The new clamping technology using two separately controlled pressure rollers enables longer sewer sections to be negotiated (range of up to 150m) and at the same time permits the cutting and grinding robot to be stabilised during cutting and grinding operations.

The internal pressure of the complete robot is monitored. The operator is given a visual warning message on the display and an alarm tone sounds to inform him if a leak is detected in the electronic installation areas.

Orientation is facilitated by a direction of view indicator in the camera picture showing the position of the robot in the pipe. This is achieved by a gravitation sensor integrated into the camera.

The flexible camera focus not only ensures that the cutting and grinding area is in sharp focus but also provides a detailed image of e.g. the pipe wall, which is nearer to the camera. This means that rehabilitation results can be assessed and documented with convincing photo material. With the IBAK Cutter-Cam there is always a clear view in the pipe. For cleaning, water is supplied and the camera rotates in a matter of seconds over an integrated rubber lip and then returns automatically to its original position.



nology enables laterals that are to be reinstated after the installation of a liner to be detected and cut open.

The installation of a liner is only the first step towards successful rehabilitation. Cutting open the laterals accurately after the installation of the liner is the next logical step. However, this is not an easy job, as laterals do not always appear as a bulge in the liner. Because of this, the present state of the art is to measure the position of the laterals very carefully. At present, a first measurement is made before the installation of the liner, preferably with a measuring tape attached to a camera tractor. After rehabilitation, a second, very precise measurement must be performed in order to find the laterals again.

Unfortunately, this method is time-consuming and there is a great risk of error. IBAK has taken up the challenge of developing a method of detecting laterals in rehabilitated sewers that does not require any elaborate measurements. This objective has led to a completely novel, electronic measurement procedure for which a patent has been filed and which analyses the material or the matter behind the liner by means of an electronic sensor, as if you were looking through the liner.

An aerial is guided along the wall of the liner which is attached to the cutting and grinding robot for this purpose. The output signal of the sensor varies depending on the recognised structure behind the pipe wall.

The section graphics from the camera inspection serve as a basis for this, so that only the approximate position of the laterals needs to be known and the entire sewer section does not have to be scanned.

The sensor system developed by IBAK, the IBAK Lateral Detector, is capable of locating laterals of DN80 or bigger in this way. It is also possible to detect not only dry laterals but also those with water in them.

When a lateral is detected, the software gives the operator a visual message indicating where the best cutting position is. Once the best cutting position has been found, it can be tapped by the cutting and grinding robot.

In a 2nd step, the cutting and grinding robot navigates automatically to the best cutting position so that the lateral can be reinstated reliably.

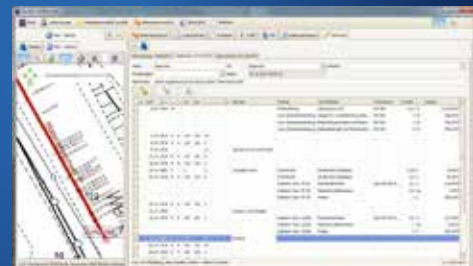
## Software – SanPlan

SanPlan is a self-contained program for convenient and effective rehabilitation planning for sewers and manholes. The system is based on the IKAS evolution software platform.

SanPlan can be used as a self-contained application independently of any other programs or as an accessory to the IBAK IKIS Sewer Data Manager. Master and inspection data is transferred via the appropriate interfaces (ISYB-AU-XML, M150, etc.). Rehabilitation jobs are registered and managed within the framework of a customer/project manager. Users who work with the IBAK IKIS Sewer Data Manager can use the direct data link between the two programs. In this case SanPlan serves as a rehabilitation project manager.

With a view to providing comprehensive rehabilitation planning functions, all the necessary data (master and inspection data, films, plans, aerial photos) can be imported into SanPlan. The user can view, check and complete this data as required.

A rehabilitation measure can be specified for each station (defect) requiring repair. Details like the rehabilitation technique, the technical parameters, the quantity and the costs are taken into account. Various rehabilitation reports are available for output.



A difference is made between renovation, repair and replacement. As it is possible to create and plan as many alternative rehabilitation measures as you like, a comparison can be made between the costs of various implementation and depreciation models.

A rehabilitation project can be divided up into different phases. The approximate costs can be estimated using a rough preliminary plan. With further drafts and in



the process of implementation and priority planning, the technical conditions and costs become more and more detailed but their calculation is nonetheless transparent.

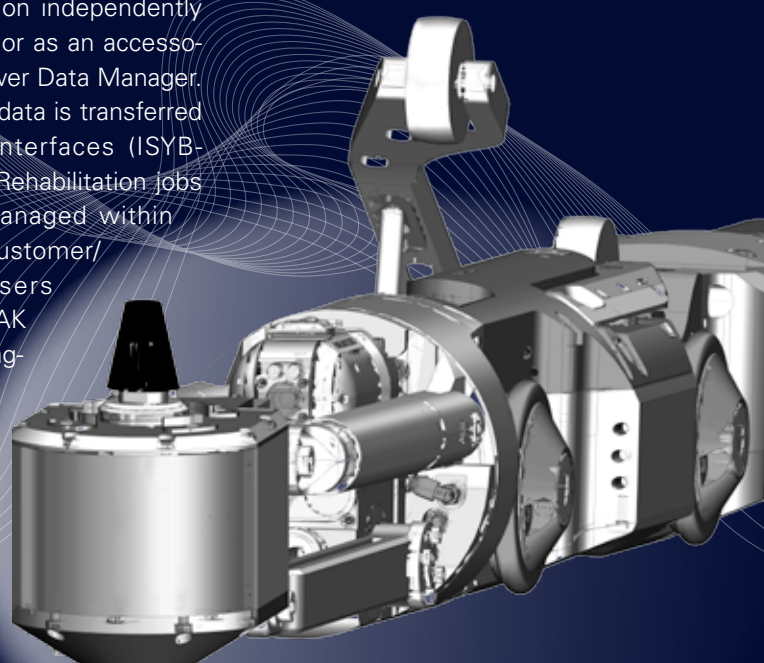
## Software – IRIS:

### Computer-Aided Private Property Handling Management

A coordinated procedure for the leak testing of sewers on private property makes it easier to assess the condition of private inflow pipes all over the country and to determine and implement any rehabilitation work that may be necessary. For this reason it is expedient to regard and treat the condition of sewers on private property as a communal project.

The IRIS software (IBAK Resident Information System) is available from IBAK as an aid to implementation

for municipalities and engineering consultants who deal with this complex task involving a large number of people and different sub-steps. The software helps the user to manage and control the individual stages of the procedure conveniently and comprehensibly. All information from the first contact with the property owners through to the delivery of a watertightness certificate is systematically registered. The user can, at all times, keep track of the status of the work on the property and the next steps required. This includes coordinating the citizens' information, recording the occurrences on the property, organising pipe inspections and assessing the results. Finally, by means of this software, proposals on how to eliminate the defects can be drawn up and the implementation of the stipulated measures can be monitored.



As the management and control of all the data and procedures for leak-testing sewers on private property should be performed in conjunction with the assessment of mainline municipal sewers, the IRIS database can be linked to the sewer data. The IKIS sewer information system and the IKAS evolution software for the collection of sewer TV inspection data are compatible with the IRIS software for this purpose.

## Lateral Detector

The IBAK Lateral Detector is used to detect the position of laterals in rehabilitated sewer pipes. The new IBAK tech-

