

ANALYSIS AND DETAILED REAL-TIME DIAGNOSIS: THE RAISON D'ÊTRE OF THE NEW JABEGA SYSTEM

The years when water networks went unnoticed are behind us. The incipient lack of water resources and the obsolescence of water transport and distribution pipes force administrations to take greater control and responsibility over the efficiency of this infrastructure to ensure an optimistic hydrological future.

Throughout the last decade, there have been great advances in technologies that seek solutions to the challenges faced by companies managing the integral water cycle. Desalination, renewal of pipes, pre-locators and in-line leak detection systems are some of the techniques that have been used to adapt infrastructures to new scenarios of consumption or scarcity.

However, after the changes that have taken place in the sector, there is a growing interest in digitalisation and preventive network management. It is difficult, in the middle of 2023, to find water management companies that do not have their networks centralized and managed

in real-time through software and synchronization technologies. At this point, the sector finds that around 20% of the water that is channelled is still being lost.

If technology is on our side, why do we keep losing 20% of the water?

It is in large-diameter networks where the sector has fewer control options and, ironically, where the losses and impact of an incident or breakage can be greater, given the flows and pressures at which they work. Unfortunately, the evaluation of the state of conservation and location of leaks in these pipes is further complicated by the great depth at which they run, the greater distance between singular elements and the impossibility of interrupting the service to thousands of consumers due to mere routine inspections. To solve this problem, Aganova developed and patented the Nautilus System in 2015, a sensor-equipped sphere that runs inside large water networks, allowing the identification of acoustic data and signals that reveal the presence of leaks,

air pockets and anomalies, as well as their level of incidence on the network, without the need to interrupt the service.

The Nautilus System can travel up to 35 kilometres in a single insertion, providing information on the presence of air pockets, anomalies and leaks starting at just 0.005 litres per second. The System was a great leap forward in the diagnosis and maintenance of large-diameter networks, saving millions of cubic metres for the environment and water managers around the world.

A further step to improve the data obtained from inside the water networks would consist in transforming this data into valuable information for decision-making by infrastructure managers, not only in terms of leak detection, but also to identify anomalies or incidents in the network. For this reason, in 2022 and with the development of the Nemo Platform, Aganova brought the digitization of all the data obtained in field operations and leak detection projects closer to the client, as well as all data related to the presence of air pockets, anomalies and leaks.

As an expert in the development of inspection technologies and data interpretation, Aganova accepted the challenge posed by the market: the identification and classification of anomalies.

The Jabega System offers full recognition of anomalies

Jabega is an innovative solution developed to obtain exhaustive information on conflict spots in water transport networks. The innovative network diagnostic tool stands out for the range of data



Jabega overhead camera.



Live diagnosis of conflicting elements.

that the system is capable to obtain from each run. Some of the most outstanding include the live visualization of anomalies such as corrosion, the presence of sediments, damaged or semi-open valves whose condition was unknown, identification of not regulated intakes, deteriorated joint sleeves or the visualization and acoustic analysis of leaks, among others. Through this new technology, we investigate beyond what happens, to discover why it happens on the network.

Versatility and analytical immediacy

The technical characteristics of the Jabega System place it at the forefront of innovation in the analysis and diagnosis of water networks. In addition to featuring a powerful CCTV system capable of recording and capturing high-quality images in real-time, the recording and acoustic system navigates the network aided by a sail, which helps optimal navigation through the pipeline under load. The technology is designed to be guided from the outside through a fibre optic

Where Nautilus are the ears, Jabega are the eyes inside the pipe

cable. In addition to obtaining real-time information, the cable enables drawing out a precise layout of the network.

The Jabega System has been designed with the aim of offering the market the versatility and immediacy sought by clients when it comes to identifying points of conflict. Putting the system to work requires only having one insertion point, normally through a gate valve with a diameter equal to or greater than DN100, and navigation paths between DN400 and DN1600. Once the CCTV system is inside the pipe, the technology is ready to carry out an in-depth analysis of the state of the elements that make up the network, as well as of the pipe walls. Since it is possible to carry out a diagnosis while operating, the client has the

possibility of undertaking corrective actions or prioritizing areas of the network from the moment of inspection.

The live broadcast of the interior of the pipe allows obtaining information as valuable as detailed knowledge of the levels of corrosion present and points with a particularly serious incidence. With the help of the CCTV system, it has also been possible to see different types of leaks, such as longitudinal or circumferential cracks. Having a precise knowledge of the different types of incidents allows improving water network management work and processes, through maintenance optimization, planning and execu-

“At Lydec (Morocco), we look for signs of deterioration in our network, and the Jabega System is a reliable and affordable solution”



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tion of corrections to ensure the proper functioning of the pipeline. In other words, efficient management would take into account the different leak correction methods based on their specific characteristics and positioning. For example, a joint leak cannot be treated in the same way as a circumferential or longitudinal leak along a section. Hence, knowledge of the characteristics of each incident

allows for the application of optimized solutions in terms of both time and resources, while minimizing water losses to the extent that reaction and correction time are reduced, since digging to reveal technical details is no longer necessary.

On the other hand, since the system is followed and monitored from the outside while it navigates within, there is also the possibility of carrying out a car-

tographic study of the section inspected; this is undoubtedly a breakthrough in the water sector.

Advanced development of elements that allow conducting operations under pressure

The Jabega System consists of a series of elements specially designed to offer an optimal service for viewing the inside of the pipeline without the need to interrupt the service. Although the visibility of the inside of the pipe is the key deliverable offered to the client, it is the result of hard engineering work that enables obtaining a high-quality product that yields an advanced diagnosis of high-speed networks. The system coordinates the audiovisual capacity of a camera equipped with a body capable of working under high pressure which, aided by a sail, can navigate in optimal conditions in networks with a minimum pressure of 2 bars and a maximum of 16 bars.

Initial success stories with the Jabega System



Butterfly valve with a high degree of corrosion. Photograph obtained by the Jábega System.



Open Jabega overhead.

The technology was launched to the market at the beginning of the year and soon boasted of having achieved great success throughout the world. Among them, the project executed during the past month of February stands out, involving five inspections conducted in Morocco that yielded high-quality images of the interior of the water network. Corrosion and deterioration in the joints were some of

the main conflicting elements detected in the network. This visualization not only made it possible to identify anomalies present in the network, but also allowed determining their extent, thus providing more exhaustive knowledge of the state and maturity of the pipes. The system could also be monitored from the outside, offering real-time pinpointing and network mapping. “At Lydec, we don’t

As an expert in inspection technologies, Aganova accepted the market’s challenge: the identification and classification of anomalies

just look for leaks, we look for signs of deterioration in our network to conduct an internal diagnosis, and the Jabega System is a reliable and affordable solution to our need”, said Abdel-Ilhah Rettab, Director of operations, Leak Detection at Lydec (Casablanca, Morocco).

Jabega technology means a turning point in the management of water transport networks, which now sees the doors open to efficient management based on network maintenance as a key to preventing leaks and sustainable aging of networks. Easy access and exhaustive analysis, immediacy, precision and versatility, a dream for water management firms that the Jabega System makes come true.



Circumferential crack. Frame obtained through the Jabega System.