

INFORMATION SYSTEMS

Israel sewage monitoring systems – an innovative water quality policy instrument

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The Israeli water sector is characterized by the introduction in recent years of high-level monitoring-systems for various aspects such as sewage chemical analysis quality, piping leakages etc. While drinking water systems have been regularly monitored for years by advanced technologies (such as ultrasonic sensors), sewage systems tend to be neglected in the aspects of sufficient monitoring of flows and water quality.

In Israel, until a few years ago, the real situation of the overall sewage system was unknown. There was a need for basic information regarding the mapping of the sewerage system and regarding the amount of infrastructure that needed to be replaced.

As for regulations regarding industrial wastewater, legislative demands promulgated in the 80' and early 90' require the industry to comply with certain quality standards in order to make sure that industrial wastewater can be treated to a level enabling to combine it with the domestic municipal wastewater collecting system.

The aim of those regulations is to make sure that industrial wastewater with hazardous chemical and biological compounds do not harm the biological processes of treatment at WWTP's. Certain industries such as pharmaceuticals or metal coating need to treat their wastewater in a different and modified WWTP to comply with Israeli standards.

The Water and Sewerage Corporations that were established a decade ago from 2001 and mainly since 2008 began using monitoring systems and assimilating new technologies of level measurements as a basic tool.

The tariff system in Israel is based on a calculation of the actual water consumption while the sewage produced is calculated at a rate equal to 70% of the water usage.

As a result, the Water Corporations that are buying the water from the national water company (Mekorot), have an incentive to reduce water loss because they already paid for the water and all leakages in the supply system reduces the amount they can sell to consumers, are thus is their own loss.

As far as the environment is concerned, those leaks of potable water are enriching the local aquifer and there is no pollution that needs to be dealt with.

However, the sewage is a different story. The citizens' payment for sewage services is according to the level of their water consumption. At the same time, the Water Corporation is paying the WWTP according to the actual amount of sewage that is getting into the WWTP and therefore, it is beneficial to the Corporation to have a high percentage of leakages in the sewage system.

In parallel to application of strict sewage treatment regulations, new Israeli technologies for sewage metering and flow measurement systems were developed in order to tackle the leakage and the pollution. Various measurements technologies were developed to enable better maintenance of the sewage system such as blockage's alarming systems, overflow measurements, real time on site monitoring systems, surveys in sewer lines etc.

On top of using innovative locally developed technologies that suit the unique local situation, the challenge in such field is to see whether the regulator can use the technologies to improve long-term investments without having deterioration in the services that the Water and Sewage Corporations are obliged to provide.

Two cases will be described in this case-study to emphasize the advantages of using the new technologies to improve the actions carried out by the Corporations. It is important and interesting to see how the technologies that were developed and applied were the actual cause or a major catalyzer for advanced regulations or standards that have significant economic values.

1. Level measurements – accurate measurements of the municipal sewage pipelines in terms of the level of the sewage or the flow, can give the Water Corporation a better and up-to-date and realistic knowledge regarding:
 - Downstream clog and near spillage
 - Priorities in current maintenance plan.
 - Priorities in annual pipes replacement plan.
 - Early warning on upstream runoff infiltration into the sewage collection system

This will also help the corporations with early warnings in cases of malfunction or better prioritization for the annual or long-term maintenance plan.

In Israel, the municipal Water and Sewage Corporations need to have their maintenance and infrastructure investment plans applied approved by the national Water Authority. If the measurements show that the regular flow rate is not as high as predicted, the consequences of such measurements might be dramatic. Therefore, usage of a technology that was approved by the regulator might save the Corporation a lot of money that can be used for further improvements. Level measurements might also ease the daily work of inspectors regarding factories that do not meet environmental criteria.

2. Sewer lines surveys – the usage of sewer surveys has developed rapidly in the last decade and nowadays we can explore and find out what the actual situation of the sewer system is. This mapping, which is effective and is getting cheaper as the technology is getting more advanced, enables modification of short- and mid-term maintenance plans.

According to the standards set by the Water Authority, if a survey shows that there is no need for replacement of a certain pipeline, then that pipeline will be approved by the Water Authority.

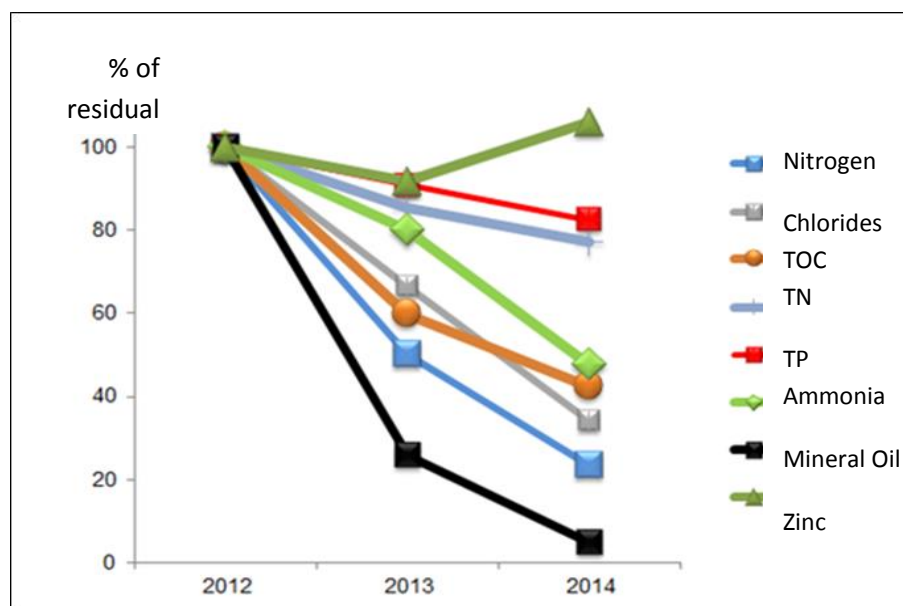
It is obviously cheaper to use such a technology as part of the maintenance plan of the Corporation rather than replacing the sewage system according to calculations, without any knowledge regarding the real situation of the pipeline.

3. Sewage quality - New Israeli technologies can indicate about some parameters of sewage quality. If a significant deviation occurs, an alarm is sent to the maintenance department and a small pump, takes a sewage sample into a sampling bottle. This sample can be sent to an authorized

laboratory to make an accurate analysis. By this technology we achieve a 24/7 ultimate control on suspected contaminating factories.

Since 2011, an extra tariff is charged by the water corporations to the industrial factories who do not achieve the environmental regulations and have high concentration of pollutants sent to the WWTP's.

Reduction of residual loads (% of reduction) of pollutants from major industrial factories to the sewage system since establishment of the new regulations and extra tariff payment



The new technologies also improved the services that the Water and Sewage Corporations give to the public. Online measuring systems can provide a lot of useful knowledge such as indications about unpredicted changes in water consumption, real time or near real time leakage detection, water or sewage consumption fluctuation etc. With such an accurate database, Water Corporations can and do improve the provided services and at the same time upgrade their own ability to control the sewerage system.

In the past few years, the measuring systems are getting better and online monitoring of water quality is constantly used to find out whether factories are complying with environmental standards for industrial wastewater. Sampling when there is no compliance with regulations is also possible and that is another option which helps to improve inspection activities.

In many cases, the installation of the monitoring system downstream the factory by the Water and Sewage Corporation, by itself, makes the factory comply with the regulations and standards.

Summary: the use of advanced technologies for sewage measurements has profoundly improved the ability of industrial plants and the ability of Water and Sewage Corporations' to implement sewage-related regulations in Israel.

When the right technology is applied, it can influence and improve the policy in a specific field. It becomes a policy instrument that can be used on a regular basis with many technical and economic benefits.

In such cases, the flexibility of the regulator to properly utilise the technologies is essential to get the best environmental results.