Sensors Monitoring and Trenchless Technologies: Two Essential Keystones Toward a Deep Innovation of Smart Pipes Backbones

G. Costantino Giaconia[1], Leonardo Mistretta[1], Giuseppe Greco[1], Raimondo Rizzo[1], Antonino Valenza[1] and Francesco Di Puma[2]
[1] DIING - Department of Engineering, Università degli Studi di Palermo, Palermo, Italy
[2] EKSO s.r.l., Ragusa, Italy

ABSTRACT

Trenchless methods are nowadays most widely used in rehabilitation of existing pipelines. It offers huge advantages compared to the traditional open cut methods eliminating costly and time-consuming excavations, reducing the discomfort of the service interruption and in most cases being the unique applicable technology, as in the common scenarios of our very dense cities.

Both industrial pipes networks and backbones for drinkable water are very important assets of our society, being water one of the most important natural resource too. There is an effort, technological and social, to reduce waste and enhance conservation of resources. The major problem in wasting is the efficiency of the water distribution networks, average losses are around 30% of the input volume with peaks near the 60% in certain areas. Hence, the rehabilitation and control of the existing pipeline networks is a crucial point to avoid waste and reduce running costs.

During the last decade the tremendous exploitation of the IoT (Internet of Things) technologies is happening in full force and including monitoring systems during the rehabilitation processes of a pipe network can lead to fully monitored systems in a few years. Having a monitored network can be useful for the manager of the distribution network in terms of fast leak detection, network control and, most important, on planning new and expensive refurbishing actions. This work will explore the state of the art investigations present at research and industrial level, trying to depict some figures regarding possible innovations that may help to increase the overall "smartness" of these crucial backbones.