



WATER IN ACTION

Partnerships

Knowledge

Solutions

Assessing the “Whole Life Costing” of networks investments

Together with Thames Water and UK pipe producer GPS, Borealis developed the first model for the Whole Life Costing of a large water pipe system.

To allow real comparison between options, the WLC model calculates all costs associated with a project throughout its life cycle, from material costs to installation and maintenance.

This pioneering research gives network designers and operators a base to inform decisions and make more sustainable investments.



Large diameter trunk water mains have been traditionally designed using old generation materials pipes because these have provided the lowest material costs. However a complete analysis over the complete life cycle reveals that the cheapest pipe is not always the best investment in the long term.

To support more sustainable investments, Borealis cooperated with Thames Water and UK pipe maker GPS (part of the Aliaxis Group) to develop a Whole Life Costing (WLC) model to compare true costs of different pipe materials for large diameter water mains.

The ability of advanced polyethylene (PE) systems to withstand end loads and ground movement was demonstrated dramatically during the Kobe earthquake in Japan in 1995. When Osaka Gas examined their gas system after the earthquake in which 440,000 homes were destroyed, they found a high level of failure in traditional systems but none in the PE part of their network. Such findings made PE extremely popular for gas networks in areas where severe ground movement is an important consideration.

Unlocking the adoption of best-practices

In the water industry, the preference for materials such as iron or reinforced glass fiber for large diameter systems is essentially resulting from historical practices. The demands on modern day pipe networks are very different with high traffic loads and constant building activity. Soil movement and corrosion are far more prevalent, and the selection of pipeline material based on cost of the pipe alone is no longer justified.

Pipe cost is just one element of a project's total cost. In order to make an informed decision in the selection of a material, it is necessary to undertake a full analysis of all costs associated with installation (i.e. trenching, bedding, reinstatement), operations, as well as future pipeline repair and maintenance.

Savings made on pipes may just vanish in the long-term and ruin the sustainability of a network investment. In Europe, the average cost of a single failure of a large diameter pipe can reach EUR 50,000 plus the collateral damages for local communities.

Basing investments on their Whole Life Costing

The objective of a WLC model is to enable the comparison of all cost elements of a project, including the long-term service reliability and maintenance costs.

The principle of WLC analysis is to calculate all costs associated with a project throughout its life to a common base so that true comparisons can be made between options. For instance, maintenance costs are calculated using the average cost of repairing a leak and the probability of failure for each type of system as derived from the UK Water Industry Research database.

The model analyses rural and urban areas and shows where and up to what diameter it is more advantageous to install advanced PE solutions. For the UK, the model has highlighted that the life-long cost effectiveness of advanced PE pipes is significantly lower compared to old generation materials. If trenchless renovation techniques using PE can also be employed, these will provide even greater savings.

The scope for the future is to include more empirical data from other European countries in order to make the model applicable for different regions and guide investments.

Ultimately cost will not be the predominant influence on pipe decisions. As water becomes a more valuable commodity, the durability and reliability of the system will become the governing factor for sustainable investments.

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To know more about Whole Life Costing, visit www.borealisgroup.com, www.waterfortheworld.net

