THE CHALLENGES OF MANAGING LONG-TERM ASSETS

Water companies in the United Kingdom are facing multifaceted and often competing priorities when it comes to maintaining their assets. Stantec's Principal Consultant, Dr Martin Li discusses the pressures the sector is facing and outlines possible solutions.

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On the surface, performing maintenance to conserve asset health or increase performance sounds obvious and the right thing to do. For instance, a person may automatically factor in maintaining their personal vehicle and home to get the maximum value out of that asset. However, for utilities and water companies' asset maintenance has fallen behind where it needs to be and recovery is becoming a herculean task.

The Challenges Faced

The reason why the UK water industry is having trouble managing assets is partly driven by the long-term investment horizons and often hidden, infrastructure assets that have long operating lives typically circa 100 years. For example, cast iron water mains have been known to live well beyond 150 years and in some extraordinary cases, can still be operational at close to 200 years old! The problem is further compounded by the fact that water companies have exceptionally large numbers of assets to maintain, repair and replace. Across England and Wales, the average size of the water main network for a UK water company (as of March 2022) was 30,000 km. To put that into perspective, if we were to put the network end-to-end that would be equal to two and half times the distance around The Equator!

Regulation, Resilience and Cost

The long-term nature of water sector assets and size of the network are not the only factors making the maintenance of this asset base incredibly challenging. The water sector must deal with the added complexity of tighter regulation, the greater drive for cost efficiency and the need to address resilience concerns such as those generated by climate change and the push to net zero. The task of maintaining a reliable network with good asset condition is exacerbated by the fact that investment is scheduled in England and Wales over 5-year periods through the AMP cycle. This means any investment in asset maintenance can take a long time before tangible benefits are observed in both asset performance and improvement to the overall asset health of the network. These 'long lag' periods in observable performance gains can and frequently do create inconsistent asset decision making. Additionally, these long-term investment decisions are susceptible to short-term policy changes or political pressures, for example, the widespread calls in recent months for the water sector to better address leakages and storm overflows.

Competing priorities

The investment decisions to replace, repair or refurbish the asset base is multifaceted with competing priorities that can create highly complex investment strategies. Trying to communicate this operational environment to the average water customer is a further challenge. Furthermore, the UK water services regulator Ofwat in its PR24 methodology has stressed the need for greater cost efficiency and value for money for customers to which water companies have responded positively. As a result, water companies are starting to present their business plans with an investment 'trade-off' lens which are heavily cost constrained. With interest rates set to rise rapidly, the cost of servicing and managing gearing ratios to fund basic asset maintenance is another area which needs to be addressed by the water industry and regulator in the future.

Water companies have a statutory obligation to maintain assets, and to operate these assets as intended to meet the various performance commitments set out by Ofwat. This is easier said than done, firstly one needs to establish what is defined as a 'stable' rate of asset replacement. This is not a trivial task since there are numerous variables which can contribute to failures such as materials, the underground depth of an asset and not just asset age. Therefore, stable asset replacement rates to off-set asset deterioration are difficult to quantify and will vary depending on the water company's operating region. This leaves water companies in a difficult position when making key investment decisions with respect to the financial cost to replace an asset versus the need to meet regulatory key performance indicators (KPIs) and the associated performance gains.

'Just in time approach'

From an economic standpoint, the optimal time to replace an asset is just before it is about to fail with the asset life fully exhausted, the so called 'just in time approach'. This principle is based upon asset investments decisions, whether to repair, refurbish or replace, needing to factor in that marginal costs should occur up until the point the marginal benefits have been fully realised. In practice trying to perform cost/benefit analysis over exceptionally long investment periods is not easy and attempting to predict when assets are likely to fail in the future is not straight forward either. The combination of these factors and the increasing focus on cost efficiency has led to the adoption of a 'fix-on-fail' type strategy. This strategy entails allowing the asset health to deteriorate to the point of failure before replacing it. Although in the short-term this is an adequate strategy to negate temporary cost constraints, it is not sustainable in the long-term nor is it best asset management practice. Essentially, this approach offsets regular asset maintenance at the expense of asset health and will in the long-term lead to the entire asset base needing to be replaced, which is far from optimal. We have begun to observe this trend over multiple AMPs of reduced maintenance funding which is now starting to impact asset health and being felt by the industry.

Recent studies have shown an alarming trend in the water industry where asset replacement rates are far below what is considered stable. For water mains from 2015 to 2020 the replacement rate was reported by one study 1 as 0.6% for England and Wales, which is approximately half the value it needed to be to achieve a 'stable' asset base. Assuming a network replacement rate of 0.6%, this implies an asset life of circa 700 years which is clearly untenable. A separate study2 which compared England and Wales renewal rates for 2021 with our European counterparts, suggested a replacement rate of 0.1% which was an order of magnitude smaller than the average mains replacement in Europe which was reported as 1% in the same year.

The prevailing trend of exceptionally low mains renewal rates in the UK over several decades is a result of numerous factors. Most notably it is driven by the under investment specifically allocated to base/operational maintenance which brings into question whether the current Price Review process is fit for purpose. Ofwat has taken steps to address this by ensuring long-term 2050 plans and using adaptive pathways to achieve long-term outcomes. However, the fact remains Water companies have to make difficult decisions about investing long-term in the asset health of the network versus the highly visible short-term performance commitments and KPIs. Often the latter is the preferred option since meeting short-term KPIs is perceived as improving performance and serviceability.

So, the problem stems from the funding mechanism rewarding short-term KPI performance and water companies being incentivised to improve KPIs thus diverting essential funding away from maintaining the asset health of the network. Therefore, the constant pursuit of trying to improve KPIs is actually doing more harm than good and is preventing the critical maintenance and renewal of assets. A good example of this is the Customer Minutes Lost metric, which discourages water companies from conducting main replacement as it causes supply interruptions which adversely impacts the KPI measure. It is precisely this culture which is driving this vicious cycle of under investment in the underlying asset base to the point where the asset health is significantly deteriorating and impacting serviceability.

Step change needed

To address these concerns a step change is required not only from a regulatory perspective but also from an asset management best practice standpoint. Both the regulator and water companies recognise the need for long-term investment planning and the benefits this can deliver. To increase the asset replacement rates the industry needs to move to a more proactive and targeted approach taking advantage of new technologies such as decision support tools, artificial intelligence and BIM modelling to quickly determine which asset needs replacing, thereby maximising benefit and mitigating the risk of asset failure. Moreover, to increase rates of renewal, we may see a dedicated cost allowance for asset maintenance and replacement and possibly a common performance commitment for water companies in the future.

References:

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2. Options for a Sustainable Approach to Asset Maintenance and Replacement, 2022, Economic Insight Ltd