

Asset Management in the Queensland Water Sector – Insights from those in the know

A workshop was held on the 13 June 2019 hosted on behalf of the TRG by *qldwater* on the subject of Asset Management in the urban Water and Sewerage sector. The meeting was attended by more than 60 delegates, with representatives from regional councils, SEQ water utilities and state agencies. The attendees included a delegation from the Solomon Islands.

Individual presentations are available for *qldwater* members and workshop delegates to [download](#).

A theme of the meeting was the trend among councils and utilities to develop their AM systems in line with the ISO 55000 series of standards for asset management, which was launched in 2014. The standard replaced the PAS 55 which had been in use since 2004.

The attractiveness of the ISO 55000 is that it is essentially a business plan, many aspects of which councils as businesses are already following. The ISO 55000 also recognises that people and culture are an important component of an AM strategy.

Chris Adam from Strategic AM Pty Ltd presented a case study on the Whitsunday Isaac Mackay (WIM Alliance) ISO 55000 readiness project. Each of the three WIM Alliance councils actively participated in the project. Pursuing the ISO 55000 has resulted in data sharing and cooperation across the WIM Alliance region, with some large-scale regional renewal projects (including sewer relining) under consideration as a result. It has resulted in other benefits including a consistency in system approaches across the region that range from risk management, levels of service, functional descriptions of the assets to asset valuations and asset lives.

Aneurin Hughes from the Logan Water Alliance (Cardno) spoke on the journey that Logan City council has taken to align itself to the ISO 55000 without seeking certification. The water and sewerage sector at Logan has a high level of customer satisfaction and is recognised as being among the most important services that the council provides. Under the direction of Daryl Ross (Water Business Manager) the council started four years ago to do their own readiness assessment, beginning with a state of the assets report, with strong engagement from finance division. From this beginning they analysed failures, repairs, sewer blockages and pumping station maintenance data, which had historically been largely overlooked. The new knowledge has been used to develop asset optimisation plans and asset risk ratings. The process is not complete, but there is now a solid framework for AM on which to build.

The journey to implement an AM system by the *Mackay Regional Council* was the subject of a presentation by *Jason Cocker*, who provided the context for the project and *Jacqueline Stewart* who spoke about the implementation. The council previously had an ad hoc approach to AM, with data held in spreadsheets, on paper and in diaries of operators. In order to maximise operational planning and proactive maintenance (for a total asset base of \$4.3 billion, \$1.5 billion of which are W&S assets) the Water Services section initiate a program of new activities. This required a cultural change that included the training of field operators in the use of tablets, a technology with which many were not familiar. After implementation, 50 service staff are now fully trained and engaged with the technology, which has resulted in: data capturing of service against specific assets; improved focus on relevant data collection; increased communication with staff including the improvement in access of staff to payroll and HR services; and increased engagement in AM by service operators. Planned future work includes data cleansing of the asset register and other system improvements and assisting other departments to implement the system.

Anna Scott from Gladstone Regional Council spoke about the big changes that the council has gone through to embed an AM culture in the organisation. Prior to the project the council had a traditional structure and there was a desire to improve staff engagement, safety (and audit results), consistency in approach to AM and risk visibility. Under the new structure the focus is strongly on AM with a strategic asset manager (leading a Strategic Asset and Performance team) with oversight across the organisation. The SAP team has a budget for 2019/20 of \$12.8 million with 60 active positions, and plans to recruit 7 more, to be funded by efficiencies gained through the new processes.

Margit Connellan from Suez provided the perspective from an entity with a mature AM strategy. SA Water, in partnership with Suez and Broadspectrum (a maintenance service provider) sought to improve the maintenance of facilities associated with its pipe network (comprising more than 39,000 pieces of equipment). The team developed a facility level preventative maintenance approach that considered each facility (e.g. a pump station) as a “black box”, without considering detailed equipment. The project resulted in \$1.5M/y savings allowing SA Water to improve the understanding of operational risks associated with the assets, establish a common awareness of criticality between operational, maintenance and asset management teams and to challenge existing PM plans against risk to the organisation.

Gagneet Serai from Unitywater presented on Unitywater's asset management planning. The Suez model of criticality and condition assessment work forms a major input for sewage treatment plant renewals. The team is seeking to assess the proportion of costs that are spent on reactive maintenance, and the reliability of critical assets. By tracking these monthly, the team can assess if the preventative maintenance is being conducted in time to reduce reactive maintenance. Maintenance and performance data is made available to all staff, from operators to business analysts, through a Power BI dashboard which can be used as an agreed basis for root cause analysis that can feed back into the AM plan. The data has enabled Unitywater to develop financial models for renewal investment based on the differing level of service scenarios (breaks and leaks), and to understand the risk distribution across its W&S network.

Troy Kasper from Logan City Council's presentation spoke to the second key theme of the meeting: the looming infrastructure cliff. In 2014 the council examined the failure of AC mains over the previous two years and examined the pipe age at the time of renewal. They found that the frequency of pipe failure was strongly correlated with the reactivity of the soils in which they were laid. Since then, opportunistic condition assessments of AC pipes have been undertaken during the replacement of main tee joints installed prior to 1980, consisting of hardness tests and phenolphthalein penetration tests, which show the degree to which the concrete in the pipe has disintegrated. Analysis of 328 samples yielded poor correlation between pipe age and effective thickness. This has been followed more recently by burst pressure testing of unlined AC pipe samples recovered from the replacement program. The results were widely variable, with as an example of the two extremes: a pipe with 40% effective thickness that burst at 589 metres of head; and a pipe with 100% effective thickness that burst at 209 metres of head. Analysis of failure modes in the AC pipes showed that 47% of the failures were pressure related.

Historical research undertaken into the manufacture of the AC pipes showed that the manufacturing process was known even at the time to result in variable product quality. Given this knowledge, the Logan City Council will undertake pressure management to prolong the life of the mains and base their replacement program on main failure rates instead of main age, while continuing to perform condition assessment on replaced pipes. Based on the outcomes of this study, Logan believe that the projected life of some of their AC mains could possibly exceed 100 years.

Stuart Wilson from WSAA spoke on the wider implications of the infrastructure cliff, which he referred to as the bow wave. In real terms there has been negative growth in W&S prices since 2013. The annual revenue required by a business is made up of three components: return on assets, operations and maintenance and regulatory depreciation. Future costs and prices are driven in a large part by capital costs which constitute nearly 60% of total costs. These in turn are disguised by the current environment of unprecedented lows in interest rates. There is continuing population growth in Australian cities, exacerbated by the common failure to realise the full costs of providing services to new developments.

The financial theme was also taken up by *Chris Adam from Strategic AM Pty Ltd* who spoke on demystifying the accounting/engineering interface by busting a few financial “myths”. Business costs of commercialised water businesses are divided into four quadrants: depreciation, operations and maintenance, interest and redemption on loans, and tax equivalents and dividends. Capital investment drives depreciation and underpins operations and maintenance spending and is the source of the debt that interest and redemptions. In Queensland 70-80% of operational costs are capital related, thus an error in capex spend can affect ongoing costs for decades. These errors can be reduced by conducting long term financial modelling and having a good understanding of the business' cost structure.

Engineers and accountants typically also have a different view of the meaning of depreciation. Accountants understand depreciation as being the decline in the economic value of the assets, which for simplicity is often expressed as a linear or curved relationship whereas engineers think of this as the physical degradation of the asset, which can be a logarithmic or more complex relationship. The consequence of this is that the renewals cost does not equal the depreciation cost, and thus the business financials may not provide a true picture of the value or state of the assets. This confusion adds to the complexity of managing assets to provide adequate levels of service while optimising costs.

There were two panel sessions during the day, with questions targeted to the speakers. From the questions and responses, the following key points were apparent:

- For smaller councils the journey to an AM system is challenging due to a limited revenue base and a tendency to focus on the visible assets.
- ISO 55000 provides a framework that is appropriate and very similar to AM frameworks in other states.
- Sharing risk models for assets would be beneficial for those councils on the start of their AM journey to make the most of the learnings from those with more mature AM strategies.
- Investment in renewals will require increases in prices, and the advice from WSAA is that if prices need to rise then the sector needs to talk to customers early, clearly and transparently to avoid a price spikes and the resulting negative reaction from customers.
- Data is the key to development of any AM plan, and for even the larger WSPs the quality of the data has been difficult to manage.
- Several of the larger WSPs were happy to share their data with the industry at large to improve AM practises.
- Regulatory depreciation masks the cost of renewals in the current environment of low interest rates and along with the historic pattern of capital investment may mask the true cost of renewals that will be borne by the WSPs and their customers.
- Cultural change and continuous improvement are both required for AM to move forwards.

- The final session of the day was led by *Dave Cameron from qldwater*, with a focus on developing the industry roadmap, specifically "Opportunities" - for future collaboration and "Policy Recommendations". The discussion included two anonymous polls. The first clearly showed that there was a high level of support for change to current AM approaches for the sector, and strong support for models which mandate AM in some way. The results are shown below.

