



**Maximising the value of  
inspections to improve  
critical assets**





# Introduction

## Making the most of your asset inspections

**Get access to asset data, inspections, conditions, associated risks, and rehabilitation plans. Learn how your investment in inspection data can be turned into valuable information that helps you prioritise intervention decisions, minimise future system failures, and reduce O&M and capital costs.**

Water and wastewater assets can fail or be damaged through a variety of factors, from age and asset deterioration to structural damage caused by obstructions or pipe connection problems for example. That presents challenges to utilities and local councils: How do they decide which assets to address while also having to react to unexpected catastrophic asset failures?

For successful asset management, ongoing inspections are vital. But those inspections create a continuous stream of asset inspection data. The key to maximising the value of all that data is to keep it organised and easily accessible to you and those that need to understand the information for fast buy-in.

Ideally, the asset information system must always be kept up to date, so that the latest asset inspections and conditions and associated risks inform your asset intervention plans. And by understanding and communicating how the asset decisions were derived, you can easily justify asset recommendations to stakeholders, leading to quicker fund approvals.





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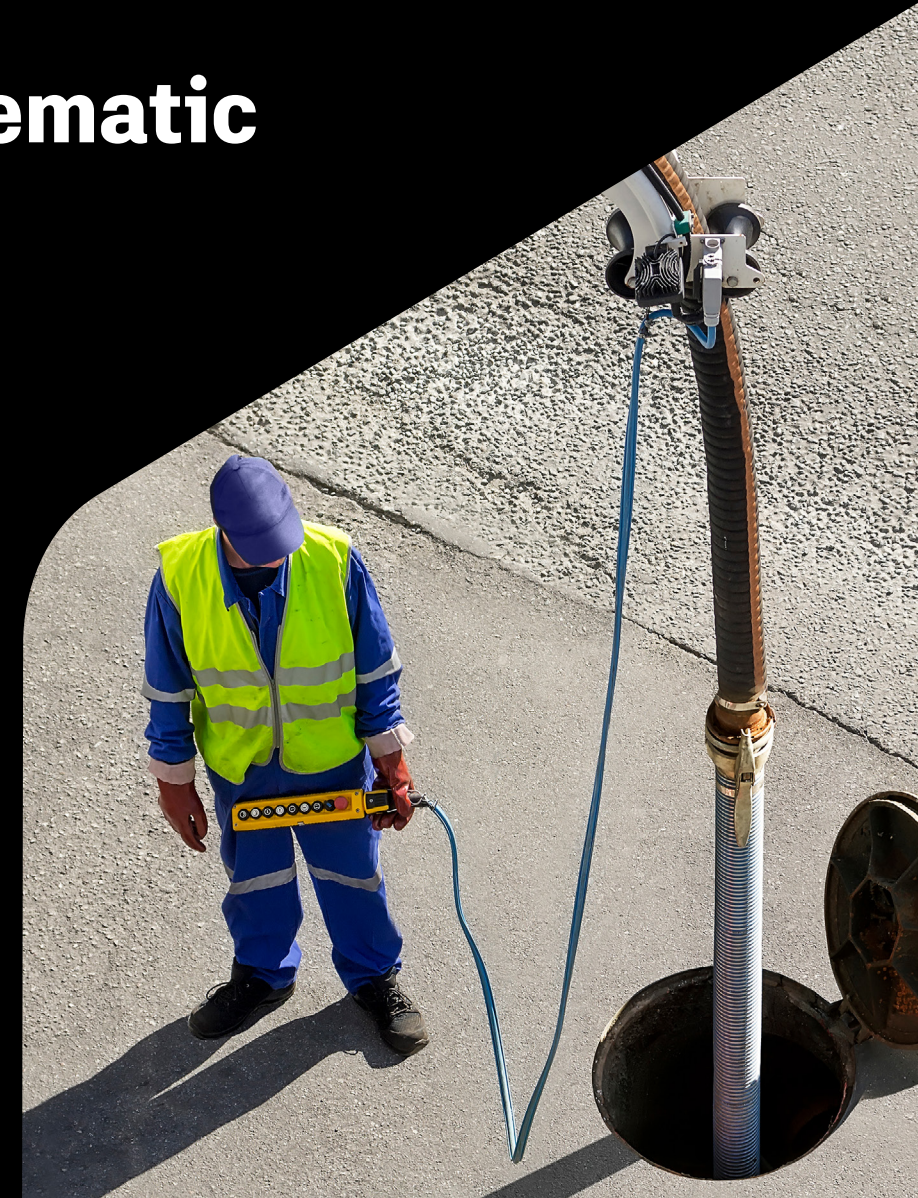


# Planning the improvement of problematic water and wastewater assets

Water and wastewater assets deteriorate over time (i.e. with age, cracks grow, they never shrink). However, asset deterioration is not simply linear. Asset structural damages might be accelerated by a wider range of complicated factors. For example, obstructions, connection problems in pipe joints, tree roots, FOG (fat, oil, and grease) could accelerate damages in wastewater systems, and small leaks would grow to lead to water distribution asset failure. The challenge most utilities and local councils face is related to asset decisions. No asset practitioners want to justify why the operations and maintenance (O&M) and capital funds were wasted on “healthy” assets, especially when they are reacting to more catastrophic problems on other assets where an unanticipated failure occurred. This decision issue tends to happen when the decision process has been based on a single criterion, such as asset age.

This is where inspecting and monitoring your assets promotes knowledge of asset condition which leads to better understanding of performance issues. It ultimately helps remove any guess work on which asset need addressing, and which intervention is the most appropriate based on the organisation's available O&M and capital budget.

In this eBook, we look at how the value of inspecting assets can be extended to prioritize the fixing of the assets that need it the most, and how any size-utility can achieve proactive asset management that improves their water and wastewater network assets.





# The challenges the water industry faces - in Q&As

## 1. Q: Why is an asset management approach important for water utilities?

**A:** A condition-based asset management promotes understanding of the resilience of the network of assets, so that utilities can solve their key challenges:



Managing aging infrastructure effectively.



Doing more with less - rising expenditures for asset maintenance and replacement.



Justifying operating and capital budgets.



Preserving loss of knowledge about assets and the overall water system, when expert leaves organisation.



Mitigating pipe failures and replacement costs.



Finding enough time to review quality of contractor inspection info.



Ensuring compliance - very costly mistake and public perception issue.

## 2. Q: Why do we need to focus on extending the value of inspections?

**A:** It is too expensive and time-consuming to not fully leverage the information provided by your condition management. For example, the average annual spend for CCTV inspections for utilities is USD 686 million in the US, AUD 21.9 million in Australia, and GBP 46,08 million in the UK.\*

## 3. Q: What can a reactive approach leading to asset failure be replaced with?

**A:** Inspections and condition-based asset management are significant to derive asset failure risk and the appropriate asset intervention that will improve assets.

*\*Average unit CCTV costs: USD 2/ft - AUD 8/m - GBP 2/m*





# Non-compliance is a costly mistake

A large municipality in the US went under consent decree, “with the goal of eliminating SSOs” (sanitary sewer overflows). As part of fixing the issue, “The City shall conduct CCTV inspections [and condition assessment of] 100% of gravity sewer mains and manholes within 10 years” [ ] “to identify defects [ ] that have caused or significantly contributed to previous SSOs; and/or, that are likely to cause or significantly contribute to the future occurrence of SSOs”.

Source: Consent decree from the [EPA](#) website



# Where to begin

## Deriving more value from inspection investments

Inspecting assets being a continuous program generates a large, ever-growing, amount of data that needs managing. With survey data that is typically manually reviewed in a siloed database or tied to proprietary software, it remains inefficient to find the right inspection when it's needed most. The uncertainty of locating the survey data you are looking for and not being sure whether it is the latest one, leads to poor decisions and low productivity.

If the inspection is eventually located, how do you then turn inspection data into valuable information you can act on?

First, start storing survey data in an easy-to-access centralised repository of inspections, each associated with the right assets so you can locate and manage delivered inspections easily. To extract information from inspections such as finding where asset problems and bottlenecks are, utilise inspections to assess and monitor asset condition and performance. By determining both overall business risk exposure, and failure risk by individual asset, information control is back in your hands.

An asset-centric approach puts all asset data and information at your fingertips. As inspections are continuously added, the asset-centric data is always up to date. This means that the latest asset condition can always be considered in risk assessment and rehabilitation planning. As a result, asset practitioners can benefit from a productive process to derive decisions within the same environment as where their inspections are stored and managed, empowering them to improve assets before failure.

## How to ensure inspection quality

Inspections are only worth the expense if they are good quality enough that defects can clearly be seen and recorded.

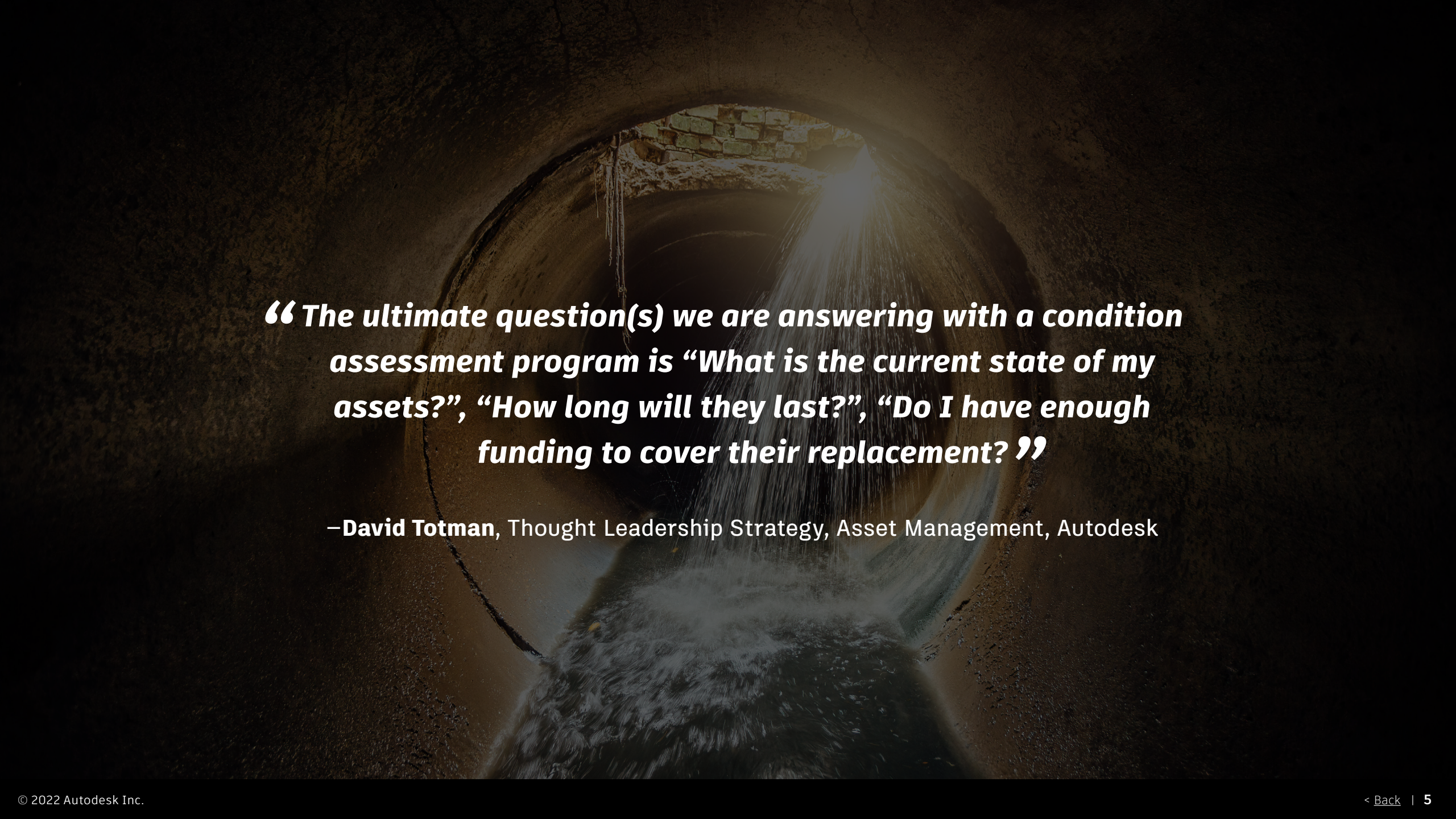
A great quality mechanism is for a software solution to ensure the quality of inspection surveys can be tracked easily.

If field supervisors are empowered to check and validate the inspection data and media before submitting to the utility office, it adds a quality verification step.

Once submitted to the utility staff, asset managers can also review the quality of inspections, and add any observation that are missing or edit any of them they don't agree with.

With auto-calculated condition ratings and grades, it ensures that inspections comply with the national coding standard.





***“The ultimate question(s) we are answering with a condition assessment program is “What is the current state of my assets?”, “How long will they last?”, “Do I have enough funding to cover their replacement?””***

**–David Totman, Thought Leadership Strategy, Asset Management, Autodesk**



# Better inform asset decisions

Implementing a strategic inspection program empowers water utilities to reduce operating and maintenance and capital costs, inform repair, renewal, and replacement decisions, and minimise future system failures.

Each step of the asset management process must be transparent so that the final decisions can easily be explained. If asset practitioners cannot justify asset decisions, it brings into question the quality of their asset intervention

## How to transparently inform decisions?

- From high-quality inspections, code defects according to your national inspection standard to determine asset condition.
- From there, using your asset data, asset condition, and any other tabular user-data you may have, derive risk's likelihood of failure (LoF). Added with an analysis of consequence of failure (CoF) within the same application, the ideal software application will provide enough flexibility to weigh LoF and CoF models to calculate risk. With each subsequent inspection added to the system, your condition profile should update automatically, which would update your risk profile, monitor risk trends, and potentially drive a different intervention decision.
- Once risk is calculated, leverage all asset data, condition information, and risk results to drive your asset decisions, and prioritize whether to repair, renew, replace, re-inspect, or do nothing to each asset.

Because producing ultimate decisions can logically be based on all information captured, stored, or calculated in your asset management information center, you can easily track where asset decisions came from. This means, making asset decisions is only helpful if the full process is easy-to-follow, repeatable, and transparent, so you and any stakeholder can gain confidence in asset improvement decisions.





# Adopting an intelligent workflow

To improve decisions, utilities and local councils need a transparent and continuous asset management workflow that will leverage historical and latest inspections. A data-driven workflow can be described below where the information in each step is used in the next step:

1. Inspection delivery and review
2. Condition Management
3. Risk assessment
4. Asset intervention guidance, informing maintenance, renewals, rehabilitation, and inspection decisions





A worker in an orange jumpsuit and yellow helmet is kneeling in a trench, working on a large blue industrial valve. The valve has a circular flange with many bolts. The worker is wearing blue gloves and is using a tool to adjust something on the flange. Another person in an orange jumpsuit is partially visible on the right side of the frame. The background is a dirt trench.

***“With a centralised asset management approach, you can defend that you are doing the right intervention, on the right asset, for the right reason, at the right time, at minimal risk and cost.”***

**—Tony Andrews, Product Manager, Asset Manager, Autodesk**



# Collaboration in the cloud

With a cloud environment, data is always up to date, so you have access to the current condition of your assets, the associated risk, and the rehabilitation plan to mitigate the risk.

In addition, if asset data and information need to be communicated within the utility or across organisations, a cloud-based web environment that is easy to use and access promotes collaboration with consultants and other stakeholders, such as compliance officers or executives.

If different access levels to the entire asset system and results can be provided, it would be possible to provide view-only access to non-technical stakeholders, risk-free of modification and of running new simulations. This combined with transparency into how asset decisions were made, empower other teams to understand how asset interventions were decided. For instance, this would enable capital decisions to be going through engineering approval and be approved quicker.







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