
Stantec
Digital approaches to asset health and condition assessment

Purpose

The purpose of this pack is to:

Set out an overall approach for efficient and effective asset health and condition assessments

Share a range of supportive innovative techniques to reduce timescales and resource input requirements

Share global best practice guidance

Asset health & condition assessment approach

Utilise existing data

Avoiding the need for wholesale surveying

- Harvesting data from previous surveys, designs, assessments or reports which are recent enough to be representative
- Incorporating existing photos or video:
  - recent as-built information,
  - 3D camera surveys,
  - Any satellite/drone imagery,
  - Any existing CCTV
- Operations feedback on condition / performance (inc. photographs, etc.)
- Jobs raised on maintenance system, historical performance, alarms, events, etc.
- Risks already identified and / or work already carried out
- Condition and performance data both live and static
- Existing criticality assessments

Prioritise new data collection

Prioritising data collection for critical assets where information is incomplete

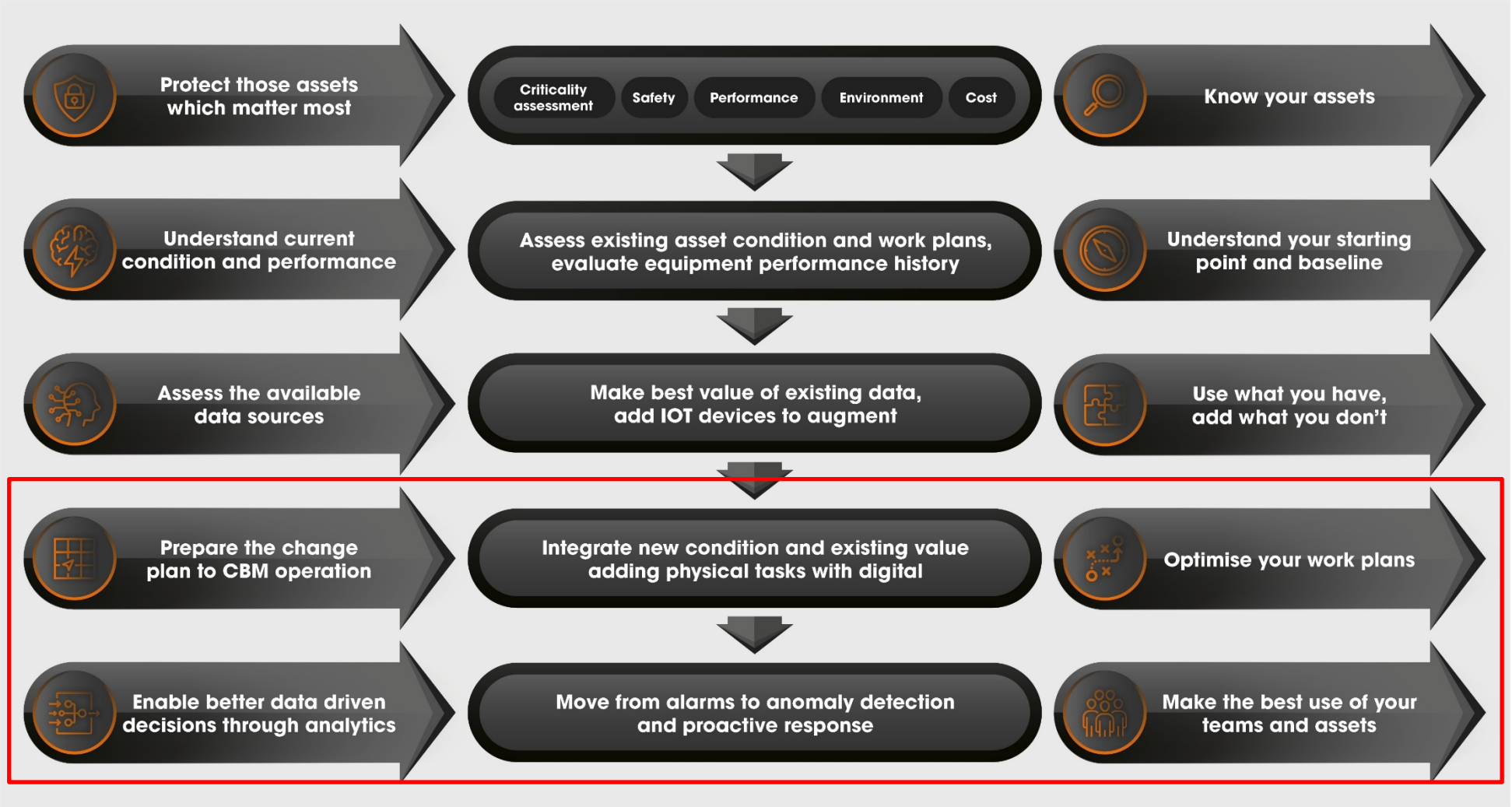
- Safety impact of asset failure
- Site criticality
- Asset criticality
- Last condition and risk assessment
- Assess “representative” assets within cohorts
- Monitor performance
- Only undertake surveys when necessary

Enable sustainable future approach (optional)

Protecting those assets which matter most

- Embed culture (change) of condition and performance assessment, both physical and digital: Make best use of existing data (including operator rounds) through analytics; and IOT devices as required to detect failure modes or remove a physical task
- Take Totex view of Condition Based Monitoring (CBM) approach
- Embed CBM and criticality standards
- Improve data quality
- Train operators / maintainers and integrate / assess value add of current activities with CBM
- Integrate data sources from across the business for maximum value (e.g. be able to look at the condition and performance of an asset but also see criticality, failure history, outstanding maintenance tasks, etc.)
- Represent within 3D / digital twin environment, with different views based on role type
- Move away from “alarm response” to “anomaly detection” to proactively response

Asset health & condition assessment approach



Optional future strategy

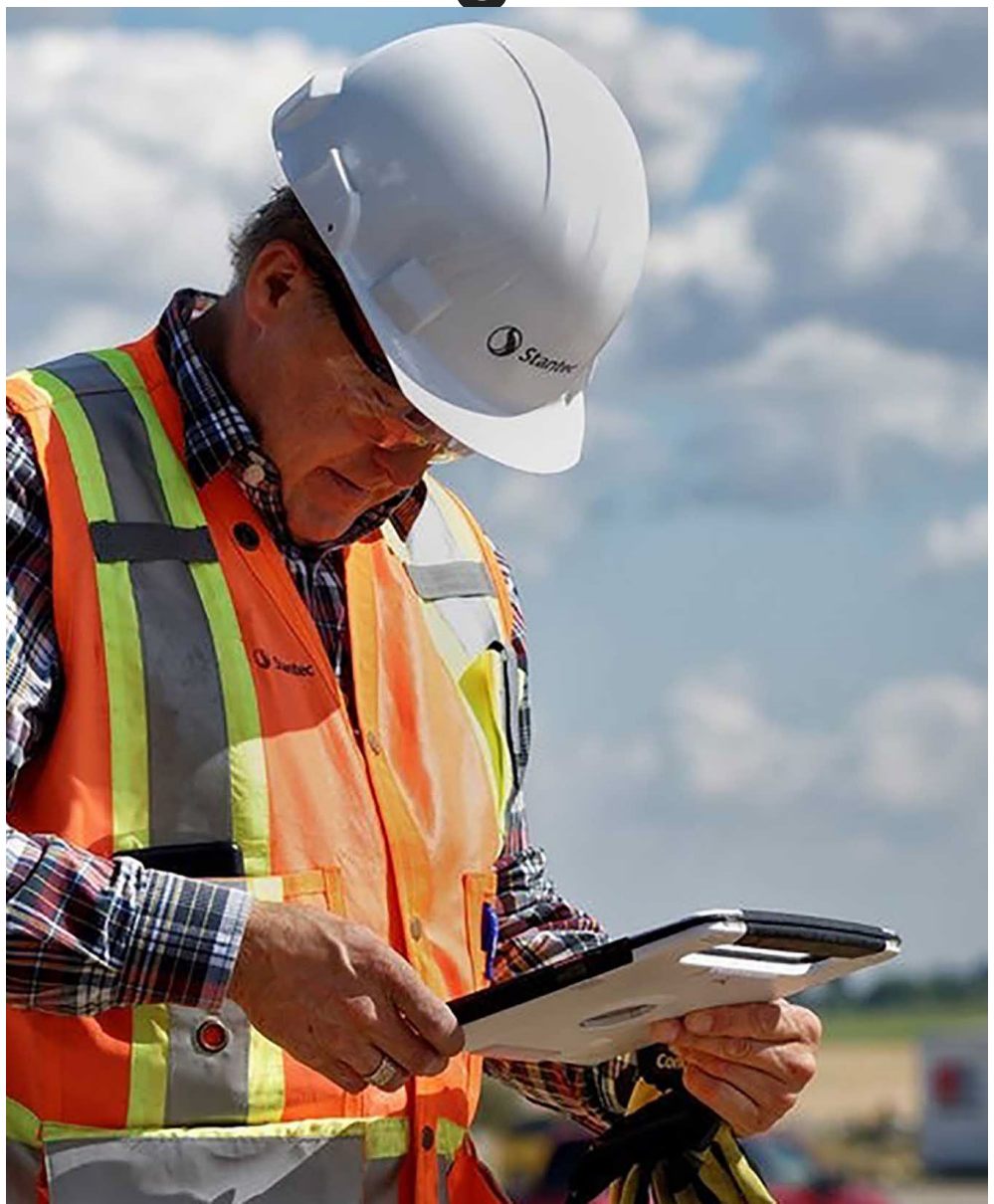
Collection and sharing of data through mTOOLS

When field data collection is required, Stantec uses our mTOOLS™ solutions to meet the needs of Field Survey and Inspection activities.

mTOOLS™ represents a collection of different software applications designed to facilitate the collection, storage, sharing and reporting of information.

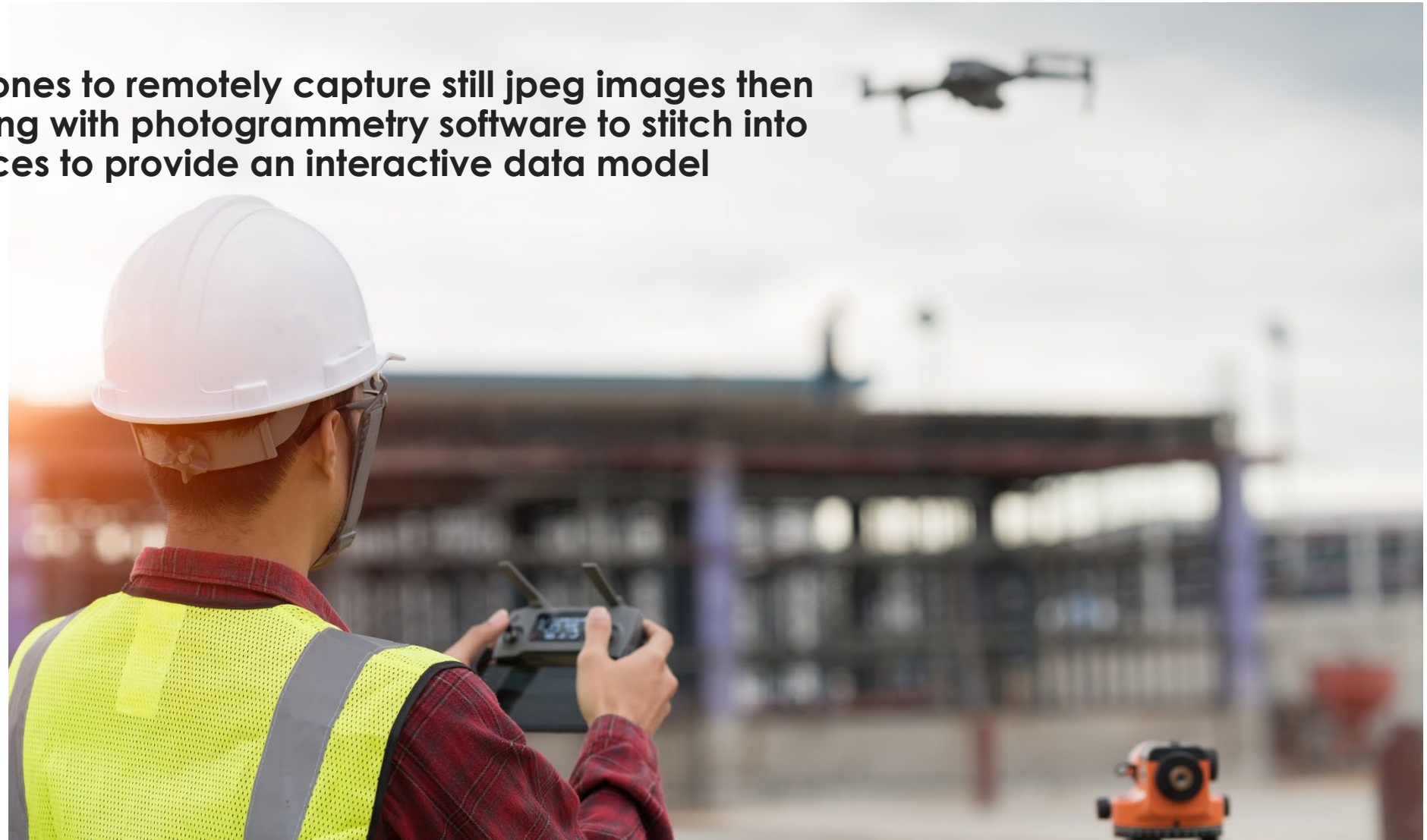
These applications make repeatable activities easy to perform while improving informational integrity and reporting efficiency / quality.

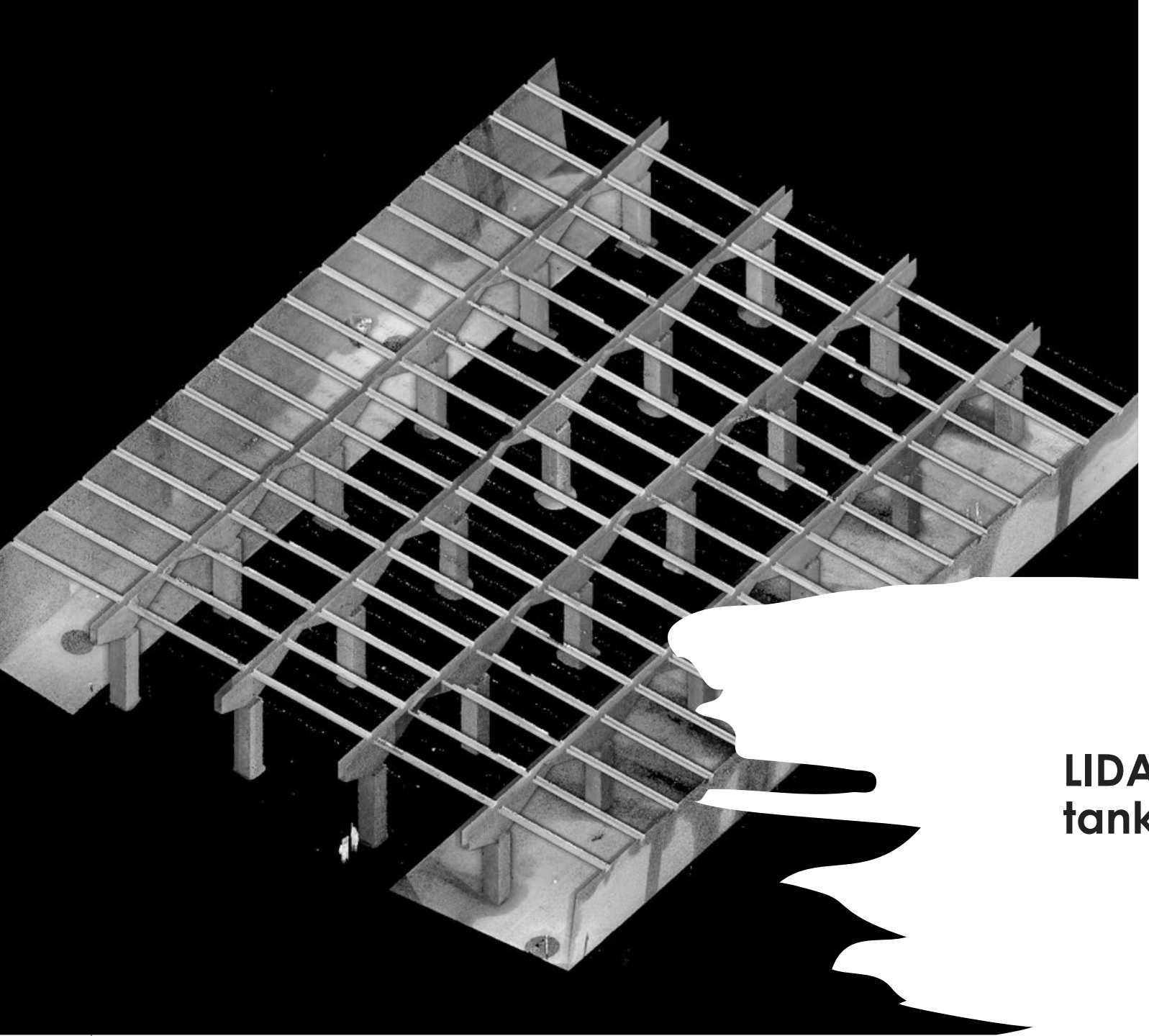
Stantec's data collection iOS app AutoForm™ used in conjunction with our project collaboration sites enable complete management of the project, the deliverables and effective delivery of the data and information to the asset owner.

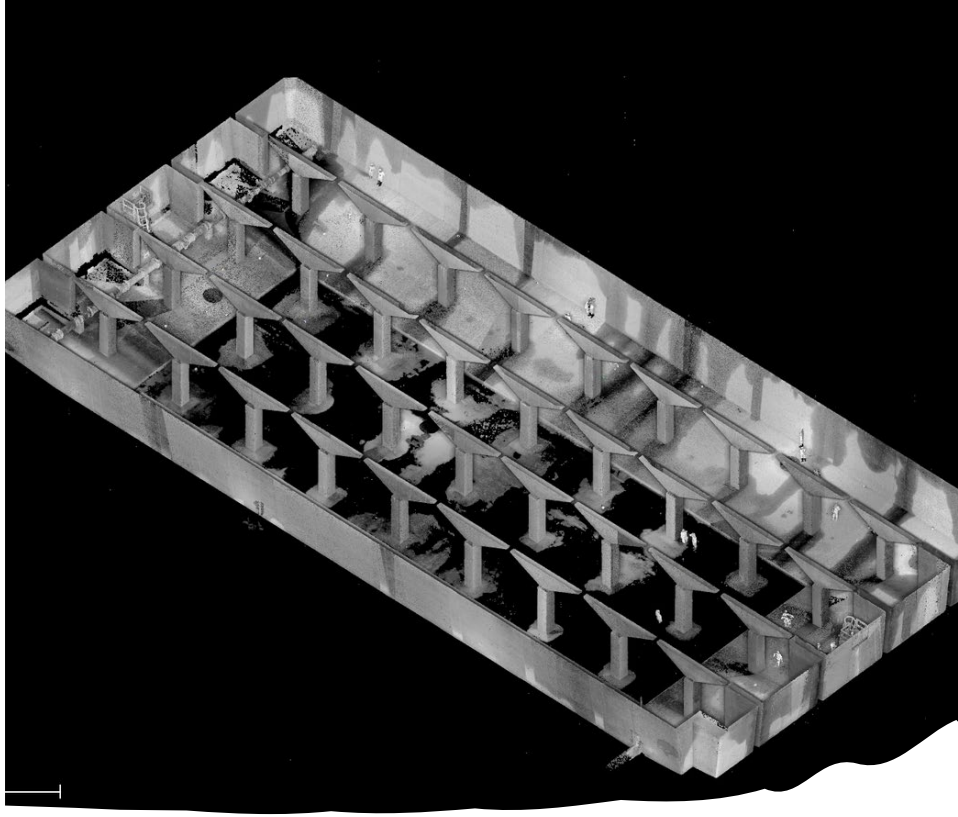


Protecting your workforce and reducing time and resource requirements

Using drones to remotely capture still jpeg images then processing with photogrammetry software to stitch into 3D surfaces to provide an interactive data model







LIDAR used to inspect internal tanks for Severn Trent Water

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Stantec global experts and The Water Research Foundation

Team up to research and provide guidance on asset condition assessment technology, and its implementation and operation to the water industry

Report Abstract

Water utilities are increasingly recognizing the importance of properly managing their infrastructure investments to achieve higher system reliability and service level at lower costs. Non-water sectors utilise innovative prognostic technologies to manage their assets, and the same technologies are slowly starting to migrate to water sector.

As technologies emerge for the water sector, application issues, cost-benefits, reliability, maintenance, durability, and performance need to be continually evaluated to develop fit-for-purpose solutions and minimize application risks.

Thus, there is a need to compile and critically review this information in order to provide guidance to the water sector on asset condition assessment technology implementation and operation. **This research project aimed to identify and map emerging technologies that provide potential for more effective solutions for inspecting, monitoring, and overall management of aging water conveyance systems.**

Results

Through a series of interviews with multiple technology developers and asset owners, 24 technologies were identified in this study, 13 of which were selected for detailed case studies. Through the interviews and case studies, critical information regarding technologies including the working principle, key features, application examples, as well as benefits and limitations were obtained.

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Benefits of project

- Provides a summary of current and emerging technologies that can be applicable to the water industry to manage current and aging infrastructure.
- Provides information about technologies that were developed by both water and non-water industries, as well as from multiple geographical regions (North America, Europe, Australia, the Middle East).
- Improves understanding of the benefits associated with smart technologies and predictive analytics for more effective condition assessment and asset condition monitoring at water utilities.
- Provides informed capital and operational investment decisions based on reliable data.
- The information obtained from this project may serve as basis for future research in the development of new technologies.

Condition assessment and asset performance guidelines – IPWEA – NAMS AU

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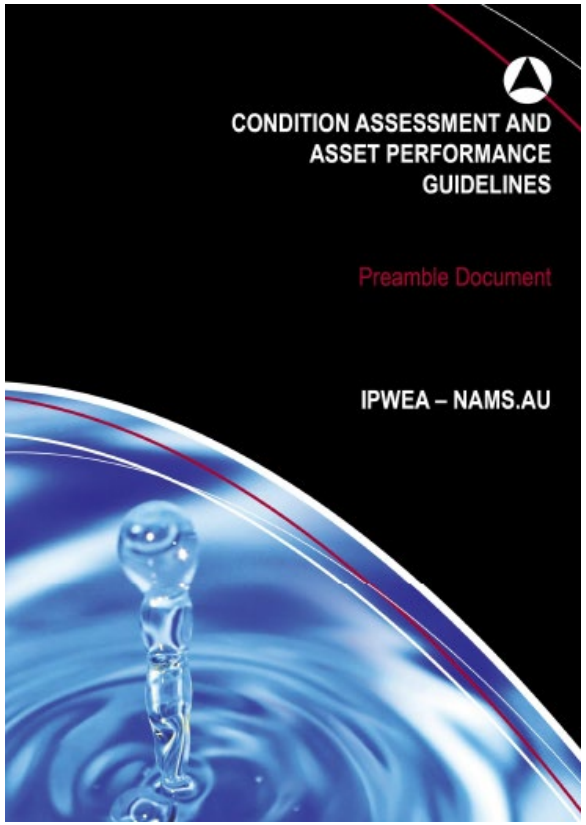
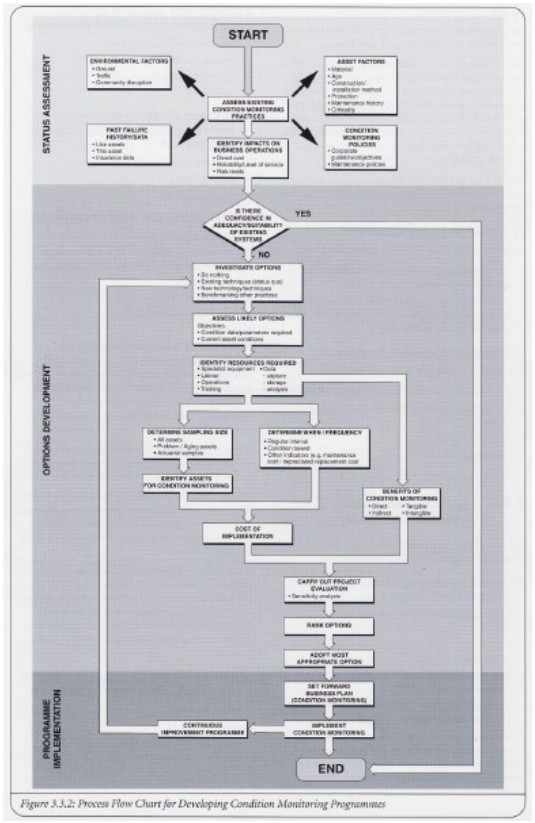
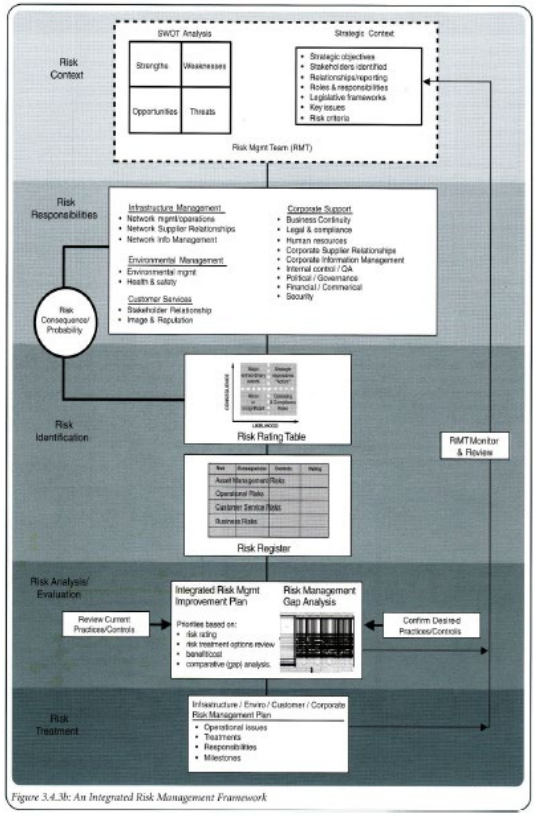


Condition assessment and asset performance guidelines



Flow chart for developing condition monitoring programmes



Integrated risk management framework