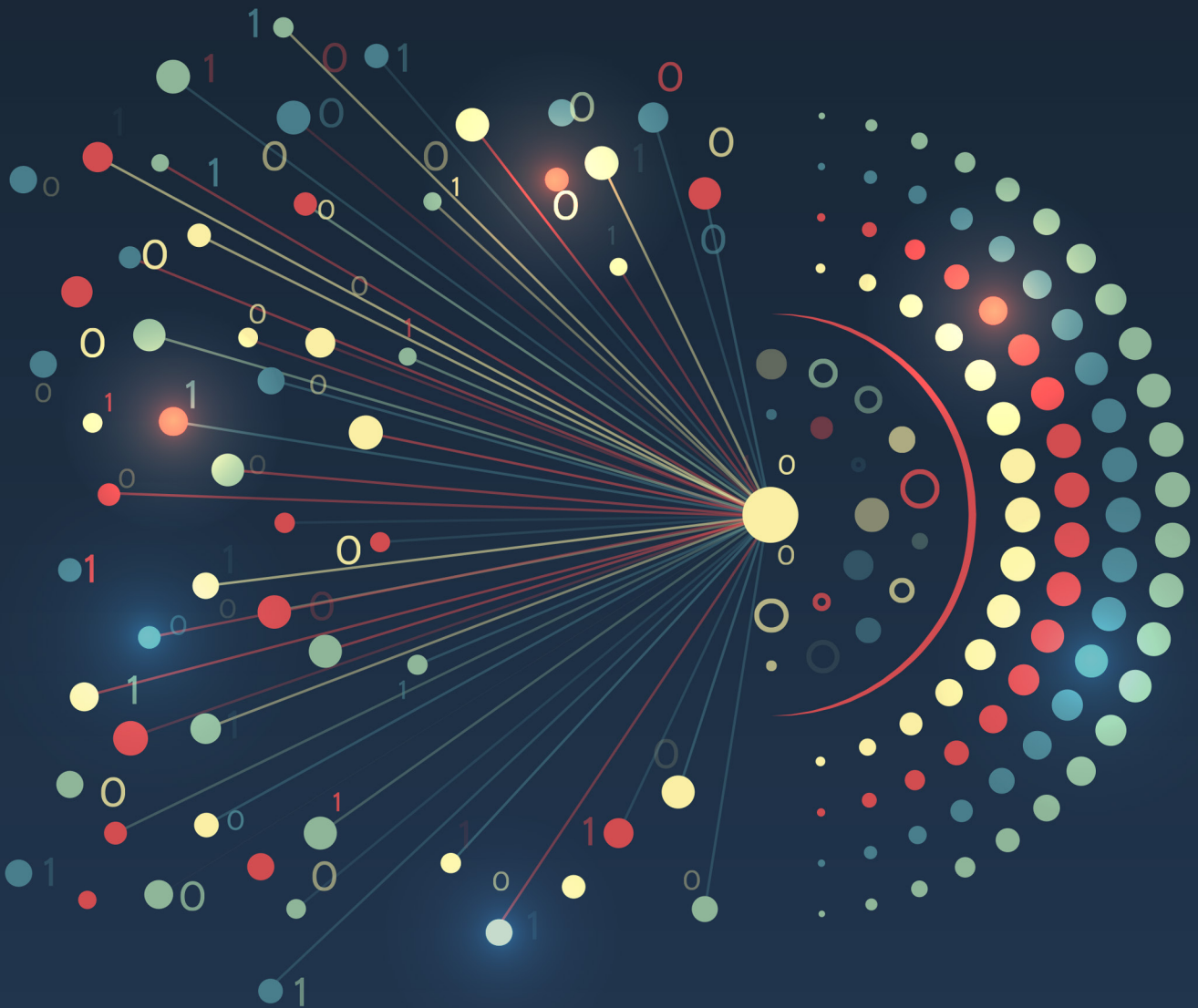


DIGITALISING TANK DATA COLLECTION



Bram Sijbers, ROSEN, discusses how digitalising tank inspection data can allow for improved predictive integrity management, to ensure the safe and efficient operation of aboveground storage tanks.

Ensuring the integrity of aboveground storage tanks is fundamental in the oil and gas industry, including petrochemicals, bulk storage, and processing. The evolution of tank integrity management has been driven by one decisive factor: the quality and availability of inspection data. In the industry's early decades, limited insight into tank condition caused operators to rely on the reactive philosophy of 'do not fix it until it is broken.' As inspection technologies advanced throughout the 1990s, the sector adopted prescriptive, time-based inspection intervals, which brought structure but treated all tanks uniformly.

Further improvements in data resolution and coverage enabled the industry to progress to condition-based inspection, supported by standards such as API 653 and EEMUA 159. This approach allows decisions to be made on the actual condition of assets rather than on schedules alone. This data maturity ultimately paved the way for risk-based inspection, enabling operators to quantify the probability and consequences of failure and to tailor their high-resolution, accurate, and structured data collected consistently, integrated efficiently, and analysed intelligently. Predictive integrity strategies depend on data quality as much as data quantity, connecting information across inspections, systems, and operational contexts to forecast degradation before it occurs.

Redesign of digital tank inspection and reporting workflow

The next leap forward in tank integrity will only be possible if the industry transforms how inspection data

is generated, processed, and delivered. With this in mind, ROSEN has undertaken a fundamental redesign of its Digital Tank Inspection and Reporting Workflow, creating a foundation built for the predictive era.

For decades, inspectors relied on pen and paper to record findings and sketch observations, while photographs were taken separately and often stored on cameras, and later matched manually with handwritten notes.

ROSEN is in the process of replacing this traditional approach with fully digital, AI-empowered data collection on a tablet with voice-to-text recognition, allowing inspectors to record visual findings, capture photographs, and enter observations directly into one integrated database. This shift not only improves accuracy, but ensures that every photograph and comment is automatically linked to the correct tank component and inspection location.

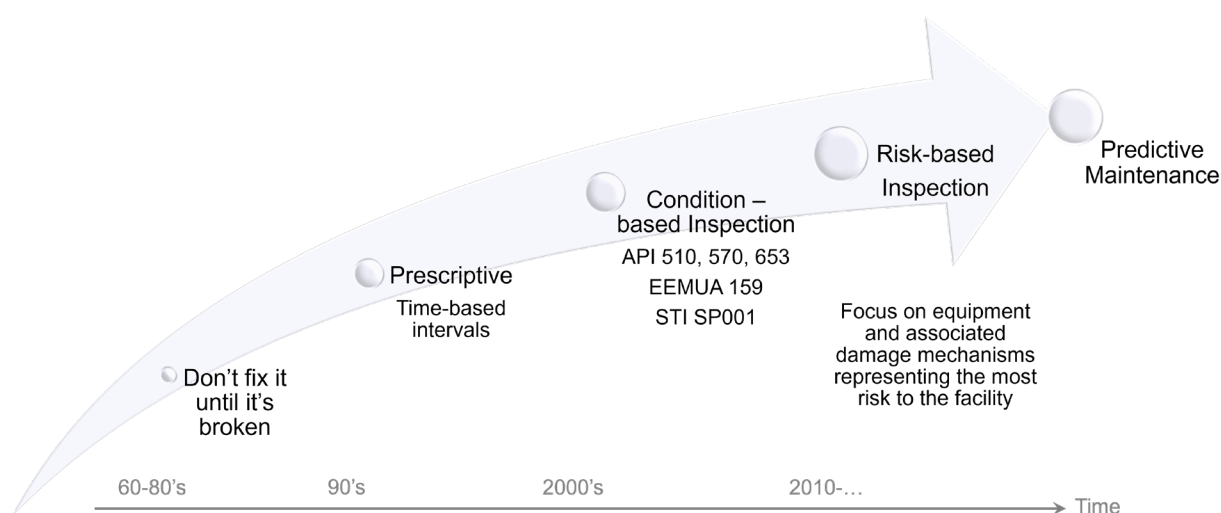


Figure 1. How tank inspection philosophies have matured over decades – improving decision making, reducing risk, and enabling modern integrity management practices.

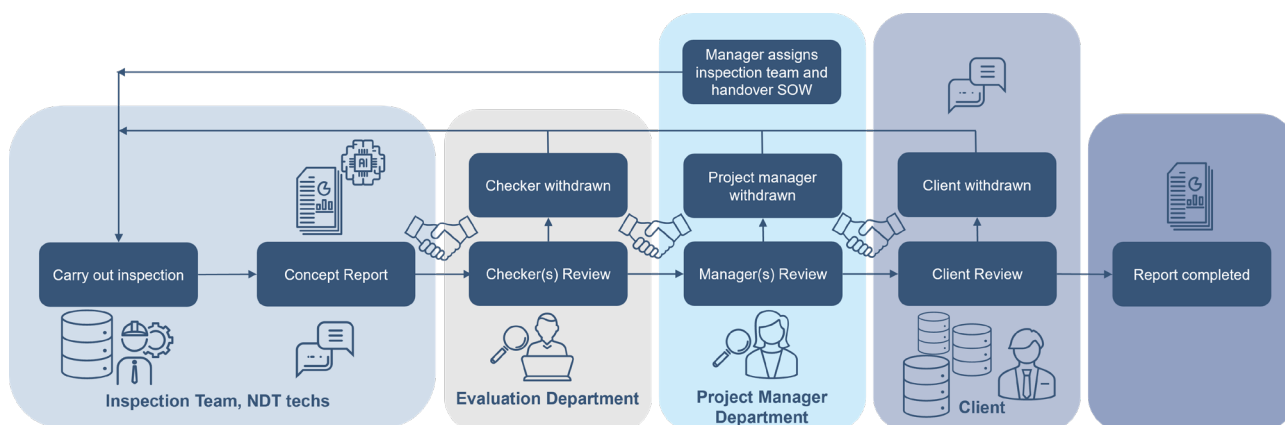


Figure 2. Structured workflow ensuring transparency, consistency, and efficient collaboration from initial inspection to final report delivery.



Figure 3. Integrated digital data collection in the field reduces manual steps and improves consistency across the inspection workflow.

AI-supported reporting and project transparency

While this improves digital data collection, the reporting phase often remains a bottleneck. Inspectors still spend hours or days converting field data into clear, structured reports. Inconsistent formatting, manual photograph placement, and repeated data entry slow the process and increase the risk of errors. Comparing current inspection results with previous data sets is also difficult when reports vary in style and detail. To address these challenges, ROSEN has developed dedicated reporting software for tank inspectors that is specifically designed around API 653 and EEMUA 159 requirements. AI plays an important role in the system by supporting automated data structuring, photograph classification, consistency checks, and automatically translating reports into any language. Through direct integration with the tablet and the captured visual inspection, the software streamlines the entire reporting workflow. Every photograph and observation recorded onsite automatically flows into the correct section of the final report, eliminating repetitive administrative steps that traditionally slowed the process.

A key advantage of the system is the increased project transparency it provides to the project team. The project manager in the office has full access to the software and ongoing inspection data, allowing the project's status to be tracked in real time. It is clear to see which inspection tasks have been completed and which sections still need to be inspected. This improved visibility and coordination between field teams and office teams, as well as with the asset owner, ensures smoother planning and quicker responses to unexpected findings.

Enabling predictive and risk-based integrity management

The time savings are substantial, as high-resolution photographs are automatically organised, and summaries and recommendations are generated based on input captured during the inspection. With AI-driven

processing, reports that once took several days to compile can now be completed in hours, allowing asset owners to receive critical information almost instantly.

AI-assisted interpretation transforms raw inspection data into structured information, supporting better decision-making and highlighting potential areas of concern more clearly than manual methods.

This new workflow also strengthens compliance and traceability. Every action, from entering data on the tablet to generating the final report, is tracked and logged. Reports are stored in a structured digital archive, making them easy to retrieve for regulatory reviews, internal audits, and long-term integrity planning.

This solution brings true digital integration to tank inspection processes by combining a modern, tablet-based field workflow with a purpose-built reporting platform, AI-supported automation, and real-time project oversight for office teams. It ensures that valuable information collected onsite is accurately, consistently, and efficiently transformed into high-quality reports. This digital approach supports more effective and safer integrity management of aboveground storage tanks.

This initiative was conceptualised collaboratively across ROSEN, with engineers looking for ways to innovate, improve efficiency, as well as listen to client feedback. Digitised data enables faster and more accurate comparisons between previous and future inspections, corrosion rate calculations, and risk-based inspections (RBI). The power of predictive analytics with RBI is only partly realised today. In the future, with more digital data and AI, it will become more accurate and powerful. For operators, this will be a valuable tool for identifying changes over time and prioritising repairs based on actual conditions. As more inspection cycles are added to the digital archive, asset owners will have a clearer, more complete picture of the tank's lifecycle performance, which will support predictive tank maintenance.

Looking ahead: building the digital tank lifecycle

Looking ahead, the digitisation of tank inspection data will open the door to even greater advantages for asset owners and operators. With data captured in a structured, readable format, integration with customer systems, such as integrity management platforms, becomes significantly easier. This reduces manual handover efforts and ensures that inspection results can immediately support maintenance planning, risk assessments, and operational decisions.

Ultimately, this new data platform which combines digital field data, structured data integration, and AI-supported reporting and analytics, will provide a foundation for predictive insights and smarter long-term integrity strategies. This will further raise the standard for the safe and efficient operation of aboveground storage tanks. 