What's inside

- Digital Shift: Industry moves from manual, siloed data to real-time, AI- and IoT-driven solutions.
- DATA 360 Platform: CRC Evans' system unifies welding, coating, NDT, and traceability in one tool.
- Smart Capabilities: Captures live data, builds digital twins, and enables predictive analytics.
- Key Benefits: Boosts productivity, compliance, safety, and planning while reducing errors.
- Real Impact: Speeds verification, automates reporting, and predicts defects for better outcomes.

WHITE PAPER

Next generation approach to pipeline data management

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Vinay Baburao, Director Digital Transformation, CRC Evans, explains how digital technology is delivering next generation pipeline services data management.

Digital technologies are set to play a transformative role in the sectors in which we operate. While historically slower to adopt new technologies, the industry is now undergoing a rapid shift—driven by the growing influence of cloud computing, artificial intelligence, IoT, and automation. These advancements are empowering organisations to predict, adapt, and optimise in ways that were unimaginable just a decade ago.

One of the key benefits being achieved across all areas of activity is the greatly enhanced access to data, how it is collected, collated, the way in which it can deliver real-time information and results, and how this in turn is bringing significant benefits to the industry.

In the pipeline welding, technology and coating services field for example, data management across the pipeline lifecycle has tended to be fragmented and reactive. Critical information from stakeholders such as pipe mills, welding crews, coating teams, and NDT providers often siloed - if collected at all. In many cases data is only compiled after project completion, severely limiting its value for real-time decision-making or quality assurance.

Field teams typically have had to rely on spreadsheets, paper logs, and lengthy email chains, creating a patchwork of disconnected records. These traditional methods led to significant inefficiencies, data loss, and reporting delays, especially across geographically distributed projects.

The absence of integrated, real-time data not only hindered operational transparency, it also made it difficult to anticipate issues or drive continuous improvement.

While partial digital solutions are available on the market, they have not yet achieved cutting edge advancement. Typically, they focus on digitising inspection data through manual entry or document uploads at various stages of production. In most cases, users had to input information into mobile or web platforms after the fact, which still introduced delays, inconsistencies, and missed opportunities for real-time insights.

Taking the various shortcomings into account, it was clear there was a need for a system of data management that would make a transformative shift from retrospective data gathering to a system that would engender proactive, connected decision-making.

End-to end integration of digital management platform

Initially conceived in response to meet a specific project requirement off the coast of Guyana during 2023–2024, where the need to capture weld data from our equipment became a critical operational priority, CRC Evans developed the DATA 360 data management platform.

Engaging in deeper conversations with clients and industry stakeholders confirmed this was not an isolated need and there was a significant gap in the market for a truly integrated, domain-specific platform capable of digitising and connecting every stage of the production lifecycle—from welding to NDT.

A next generation solution, DATA 360 is fundamentally different from the partially digital solutions available on the market, delivering true end-to-end integration, consolidating material traceability, welding, coating, and NDT into one unified platform.

Rather than relying on fragmented tools, it provides a purpose-built digital ecosystem tailored to the complex demands of pipeline and fabrication projects, automatically capturing data directly from welding and coating machines as production occurs.

This real-time data flow replaces manual logging and ensures immediate visibility, accuracy, and operational intelligence. In comparison to other systems that digitise after the fact, DATA 360 digitises in the moment - transforming how data is collected, connected, and used to drive smarter, faster project execution.

Cutting-edge digital technologies

It leverages a suite of cutting-edge digital technologies designed to transform how energy infrastructure is planned, executed, and analysed. These technologies don't just digitise data, they enable a more intelligent, connected, and predictive approach to project execution:

- Cloud computing ensures secure, scalable access to project data from anywhere in the world, enabling collaboration across global teams
- AI and optimisation algorithms power PipeFitter, our industry-leading solution for pipe stalk configuration, dramatically improving fitment efficiency and material usage.
- AI-based geospatial clustering is used to intelligently assign unique joint IDs by analysing GPS data, reducing errors and enabling automatic traceability
- IoT integrations connect directly to welding and coating machines, capturing production data in real time, eliminating manual entry and unlocking live operational insights.
- A mobile-first architecture empowers field teams to report and access critical information instantly, streamlining workflows and improving responsiveness

At the heart of DATA 360 is a vision to create a digital twin of the energy infrastructure as it's being built, a living, evolving model that mirrors the physical asset and unlocks powerful capabilities in traceability,

quality assurance, and lifecycle management. In short, it doesn't just collect data, it builds intelligence into the infrastructure itself.

It is now being deployed across multiple global onshore and offshore projects, with feedback confirming it is delivering a wide range of benefits helping clients improve operational efficiency, ensure compliance, and reduce project risk.

Core advantages for clients

Its application is relevant across various sectors where production complexity and traceability are critical to success for industries that operate under strict regulatory standards and demand end-to-end visibility across the asset lifecycle including oil & gas pipeline construction, offshore wind and renewable energy projects, process plants and fabrication yards, where high-volume, high-precision welding and material tracking are essential and Infrastructure projects involving pressure piping or regulated welds.

Some of the core advantages include:

- Improved productivity through faster data reporting and reduced rework
- Complete material and weld traceability to meet stringent regulatory standards
- Real-time monitoring of production and asset performance
- Elimination of delays caused by manual paperwork or miscommunication
- Data-driven decision-making for better planning and resource allocation
- Increased transparency across all project stakeholders

Incorporating cutting-edge digital technologies provides expedited access to production data, improved analytical capabilities, and precise data tagging.

This reduces downtime and minimises the number of inspection personnel required to extract, transform, and analyse data. Additionally, the platform serves as a data repository of as-built documentation for customer infrastructure, with data curated and ready to use for compliance needs.

The DATA 360 platform enables real-time monitoring of production activities during welding, coating, and inspection. The platform utilises long-range WiFi communication, which allows for the wireless downloading of logs from all stations and evaluates the status of joints based on the parameters established during the qualification process.

Delivering real-world impacts

At a time when clients are under growing pressure to improve compliance, efficiency, traceability, and sustainability, DATA 360 responds to those needs, not just as a product, but as a transformation tool for how projects are executed and managed in the digital age.

Real-world impact examples:

- Reducing downtime through real-time weld verification – in a recent offshore project, compliance required validating weld parameters after each pass before moving to the next station. Traditionally, this would have meant a technician had to manually download data from each welding machine, analyse it on-site, and confirm compliance, a process that could take 15 to 20 minutes per joint. The welding module in DATA 360 provides automatic verification in under 30 seconds, eliminating delays and human

error.

- Accelerating regulatory compliance reporting - compiling final documentation can be a significant burden for projects with strict regulatory oversight. DATA 360 can reduce the timescale from months to weeks.
- Reducing manpower and exposure on the firing line - traditionally, field teams would need to physically monitor the production line, manually collecting data on each joint. IoT-enabled systems integrated into DATA 360 capture this information automatically in real time, reducing the number of personnel required, minimising exposure to hazardous environments.

The advent of digital transformation is not just crucial for end-users, it is increasingly imperative for businesses to reinvent how they work to ensure they remain relevant, current and fit for the purpose of servicing modern day requirements.

As we look to the future as an industry, I see immense potential to build intelligent tools that can provide real-time guidance, automate analysis, and support decision-making in the field.

As a business we are also exploring how Physical AI can be embedded into our core equipment, making machines not just connected—but context-aware and self-optimising.

This convergence of operational data and intelligent systems will mark a new era for our industry—one where digital technologies don't just support the work but actively enhance it. The future is not about replacing human expertise, it's about amplifying it with the right data, at the right time, in the right way as we lay the foundation for that future today.

Case Study – welding

In a welding project, the ability to swiftly identify the root cause of defects and minimise downtime is of utmost importance. The vast amount of data generated during welding poses a challenge, as it requires significant time to collect and analyse data from every station and welding system.

This process becomes even more complex when welds are not tagged, making problem identification more difficult. Therefore, a solution that can streamline this data analysis process is crucial for reducing downtime and improving efficiency in welding projects.

DATA 360 revolutionises how we handle welding data. By wirelessly collecting and hierarchically collating data it presents a comprehensive overview to the user. This system's ability to indicate if data falls within the set limits of welding parameters could be a game changer in identifying and resolving issues in a few minutes.

Identifying the issues during production is only one of the benefits of DATA 360; the data collected is helpful in the extracting operational insights about the project. Furthermore, the welding data and defect data