



FIT FOR THE FUTURE

How can bridge managers ensure that their systems keep up with the development of new technologies? Saeid Naelini explains

Technology has been used to support the construction, operation and maintenance of bridges for decades; even an Excel spreadsheet qualifies as technology at its most basic level. Traditional software systems are designed with static data acquisition as the prime objective, but that approach can no longer sustain the evolving demands of bridge management.

Often organisations find themselves restricted by the limited functionality of an off-the-shelf system that is only intended to fit one particular need, output or regulation – and these are always changing. Such limitations force compromises that only serve to increase frustration for users, curb potential for change and deny stakeholders opportunities for growth.

Continued innovation in bridge management has seen the introduction of new scanning methods, measuring tools and monitoring equipment, and the scale of projects has led to an ever-increasing range of asset types and a demand for even greater detail. Modifications to social and environmental policies have led to an introduction of new compliance guidelines, and economic pressures have prompted the value of assets to be reconsidered, such as a bridge being considered a tourist attraction rather than just a functional object.

In this context, it is important that the digital systems used for bridge management are adaptable, not just given a new lease of life, but being able to scale and grow to deliver services that are relevant to the users' specific needs.

How can this be applied in a bridge management context? The architecture of a proven software system has to be fundamentally changed so that it can accommodate new requirements and assist in realising the potential of assets as new demands are identified. A system that is fully customisable by the user enables a workable solution to be created with limited IT or technical support, providing a tool that has all the principal functions required, but can be tailored to fit the user's own bridge management process, terminology, asset types, team structure, government regulations, language and strategies – in a similar way to a user being able to change their profile, description and cover photo on LinkedIn. This new approach to database solutions ensures longevity rather than a short-medium term fix.

The top ten most relevant benefits of customisable bridge management software range from the ability to manage multiple asset classes, to the establishment of accountability at all levels, and increased confidence from clients.

Associating different asset classes such as electro-

mechanical and civil engineering enables a more comprehensive and holistic approach to asset management.

In the Middle East, for example, a bridge may have electro-mechanical elements such as escalators, lifts, fountains and air-conditioning units, in addition to its structural component. Adding these asset classes brings everything into a single environment, culminating in one service to the client – in this case, the public. The ability to add new asset types at either parent or child level opens up possibilities for growth.

The ability to create forms and custom data fields that meet local requirements and support best-practice standards for data collection helps to ensure that detailed, relevant and contextual data such as defect photographs or weather conditions, is recorded at the point of capture, minimising errors and providing background information for retrospective actions, improving overall efficiency.

When delivering service-orientated maintenance contracts, it is essential to have clear oversight of any surplus or shortfall in resources by optimising inspections and work order management in an adaptable schedule. Being able to proactively make changes when unforeseen responses are needed, whilst at the same time maintaining the same standard of service helps organisations demonstrate a coordinated and cost-effective approach. For example, bridge managers may need to carry out emergency inspections after flooding or an earthquake and need to adjust routine maintenance to suit.

Assets themselves may be stable and enduring but the world around them is evolving quickly – the introduction of new materials and methods of construction on one hand, and the introduction of new technologies on the other. The increasing use of drones to carry out inspections in unsafe or hard-to-reach conditions could prompt a change in the frequency of inspections, and capture additional data that facilitates better decision making.

The ability to synchronise with other operational systems is a crucial factor. A stand-alone solution may take longer to extract and correlate data that can be critical. Using mobile connectivity and API services enables a consistent, cohesive approach to data sharing, helping to synchronise multiple business activities and improve communication between teams. Incorporating live data from monitoring devices, such as cameras or wind speed measurements, can feed into a lane closure device and trigger an response. Such automation can be timely and places less demand on resources.

In an industry with complex operational processes and

financial pressures, being able to identify potential delays, inefficiencies or resource issues is a key factor. Highlighting where improvements can be implemented provides real added value. If a structure experiences multiple strikes and demands more attention, consideration could be given to alternative safety measures such as better road surface friction on the approach, to improve braking capability.

In-depth analysis and interrogation of data through customisable reporting means that decisions can be made at any operational level based on the most recent, accurate and detailed information available at any time. Extracting reports that reveal a repetitive defect, repair or other known problem enables frequency of occurrence to be established in context, along with prevailing conditions and environment, to formulate a strategy for improvement or a change to the solution.

With the option to create unlimited user-defined permission levels and access to data, accountability is established. Managers can create, monitor and react against a variety of KPIs, meaning they are more observant and contribute to improving operational effectiveness.

For example, data can be reviewed to support or accommodate adjustments in budget allocations; one client has used this to secure government incentivised funds by demonstrating good levels of management and achievement of key performance indicators.

Being able to demonstrate your value helps in establishing a good working relationship with your client. A system that uses only quality assured data with the flexibility to adapt, enables organisations not only to demonstrate accountability but also to provide evidence to support recommendations for change or improvements. Interrogating the data within the system to produce reports at any point in time underpins the quality of customer service.

Most off-the-shelf asset management software will do the basics, but the advantage of customisation is that the system can sit at the heart of day-to-day management operations, supporting the organisation's strategic objectives across the lifecycle. It optimises resources and the return on investment through perpetually adaptable processes.

A customisable solution empowers bridge managers to take full control of their procedures and the personalisation functionality ensures information is completely relevant, opening the door to improvements ■

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