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V53.1

DYNAMIC INFRASTRUCTURE



 **Crack**
Delta +12%
since 2017

 **Spall**
Delta +25%
since 2015

 **Corrosion**
Delta +25%
since 2018



TRANSPORT
INFRASTRUCTURE
ITS TECHNOLOGY
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WHERE ARTIFICIAL INTELLIGENCE MEETS ASSET MANAGEMENT

WHERE AI *MEETS* ASSET MANAGEMENT



Asset management and maintenance planning can be a challenging task at the best of times – especially when it comes to critical infrastructure assets such as bridges. Together with scheduled inspections, condition reporting, assessment of faults, failures or damage, and of course, the challenges associated with collating and managing all of the data, there is also the matter of prioritising and scheduling repairs and maintenance for specific structures within the context of the entire asset pool.

In short, bridge asset management and maintenance planning is a complex and often onerous task, even when dealing with only a relatively small number of bridges.

Be that as it may, this is all set to change, thanks to a ground-breaking new service and software package from international technology specialist Dynamic Infrastructure.

The package, which utilises the latest in cutting-edge AI (Artificial Intelligence) technology to identify and categorise faults and damage on bridges and other structures, is now available across Australia thanks to a partnership between Dynamic Infrastructure and respected Sydney-based specialist engineering and consulting company IF3 Pty Ltd.



Above: Despite the complexity of the AI technology which lies at the heart of the Dynamic Infrastructure system, the software excels in terms of its design and usability.

'GAME-CHANGING' TECHNOLOGY

While the term 'game-changer' tends to be somewhat overused in this day and age, the Dynamic Infrastructure package genuinely qualifies for this accolade in every sense of the word.

Provided to asset owners and managers on a SaaS (Software as a Service) model, the Dynamic Infrastructure package delivers significant savings in terms of both time and cost. As well as simplifying and streamlining the tasks associated with bridge asset management and maintenance planning, the fact that it is provided as a fully-supported cloud-based SaaS system, means that it also eliminates any additional burden on in-house IT services, including the need for increased in-house processing capacity or specialist software professionals.

Importantly, while the benefits of the SaaS model are now widely recognised and accepted across a wide verity of software platforms, it is Dynamic Infrastructure's processing and reporting capabilities which really put it in a league of its own – starting with the data collection process.

Whereas many traditional asset management and monitoring systems require data and reports to be provided in a specific format or worse still, manually entered and/or converted to a specified, often prescriptive format, the Dynamic Infrastructure system utilises all existing data and reports, regardless of the format or age - including paper-based engineering drawings and plans, photos, paper-based inspection and condition reports, together with digitised data and images - to build a detailed 'health record' for each bridge asset. The asset owner/manager simply provides this data to Dynamic Infrastructure, and they take care of the rest – scanning, converting an inputting the data into the system ready for analysis.

UTILISING AI TO IDENTIFY AND CATEGORISE FAULTS AND DAMAGE

Once the initial data has been collated into an asset record and the bridge has been assigned its unique identifier, the system's state-of-the-art AI algorithms get to work analysing the data and images to identify any faults or damage. Any issues that are identified are then categorised (type of damage, severity, etc) and logged with their exact location on the structure, with this data appended to the bridge's health record.

Speaking about the new system, Dane Hansen, General Manager with Dynamic Infrastructure's Australian partner company if3 Pty Ltd, commented:

"We're very excited to be able to bring the Dynamic Infrastructure technology to Australia. It really does represent a major step forward in bridge asset management and maintenance - both in terms of the system's capabilities, and the massive savings that it can offer to asset owners and managers."

"The cutting-edge AI technology used by the system is incredibly thorough and is able to identify and categorise all manner of faults and damage from photos and other historic data," Dane said.

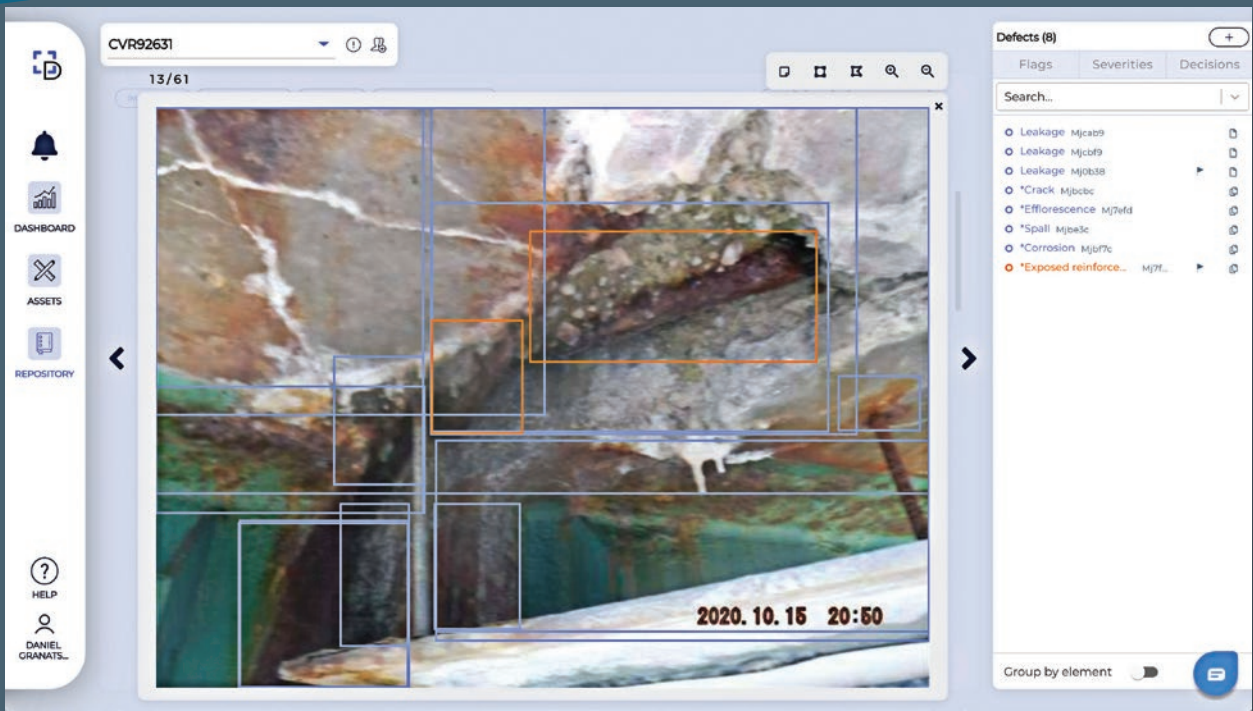
"What's more, once the historical data has been used to create the bridge's 'health record', the system collates the fault data by location on the bridge, and in chronological order, creating a 'timeline' for the bridge as a whole, as well as for each individual identified fault. This not only enables users to keep track of faults and check for any escalation in severity, it also allows repairs to be prioritised and then logged when complete so they're no longer flagged as requiring attention," he added.

"Using AI technology to identify faults and damage effectively transforms the entire process from a subjective one which relies on an individual to find and identify all faults on a structure and then make a judgement call on severity, to an objective one where all faults are identified, categorised, logged and then rated for severity against a global database of over 30,000 bridges and counting," Dane Hansen added.

INTUITIVE AND EXTREMELY EASY-TO-USE SYSTEM

Perhaps most importantly, despite the complexity of the AI technology which lies at the heart of the Dynamic Infrastructure system, the software excels in terms of its design and usability. Indeed, the system's Graphical User Interface (GUI) is both intuitive and extremely easy to use, with a structure and layout that stands as testament to the software engineers' obvious commitment to what is considered by many to be 'the first rule of software design'...the user experience should in no way reflect the complexity of the system.

Individual bridge assets are allocated a unique global identifier - complete with its own individual email address. Each bridge asset record carries a fully detailed yet easy to navigate history of condition reports, images, identified faults, repairs and maintenance requirements - all of which can be classified and prioritised for budgeting and/or work scheduling. What's more, once the record has been established, it is extremely easy to manage and append.



Above: The Dynamic Infrastructure package uses AI technology to automatically assess and identify faults from photos taken by field staff.

Together with the system’s cutting-edge AI capabilities, another innovative feature of the Dynamic Infrastructure package is that rather than relying solely on data from formal, scheduled bridge inspections, it also allows for data such as photos taken by field staff of damage resulting from an incident to be added to the bridge’s ‘health record’ record by email. Critically, this email capability does not require the field staff member to have their own individual login for the Dynamic Infrastructure system to submit photos and data relating to bridge damage.

For example, if a field crew or incident response team identifies new damage or a new fault on a bridge structure, all they need to do is take photos of the damage and note its location on the structure. The photos and location data can then be sent via email to the bridge’s unique identifier email address. Once received, the images are scrutinised by the system’s AI algorithms, with information relating to the type and severity of the damage, as well as the exact location of the damage, added to the bridge’s individual ‘health record’, together with the date and time.

As with all other condition data and damage assessments, the system provides the opportunity for the licensed users to access and/or modify data relating to the type and severity of damage, and to allocate priority code for both budgeting and operational purposes.

FIRST AUSTRALIAN CONTRACT DELIVERING OUTSTANDING RESULTS

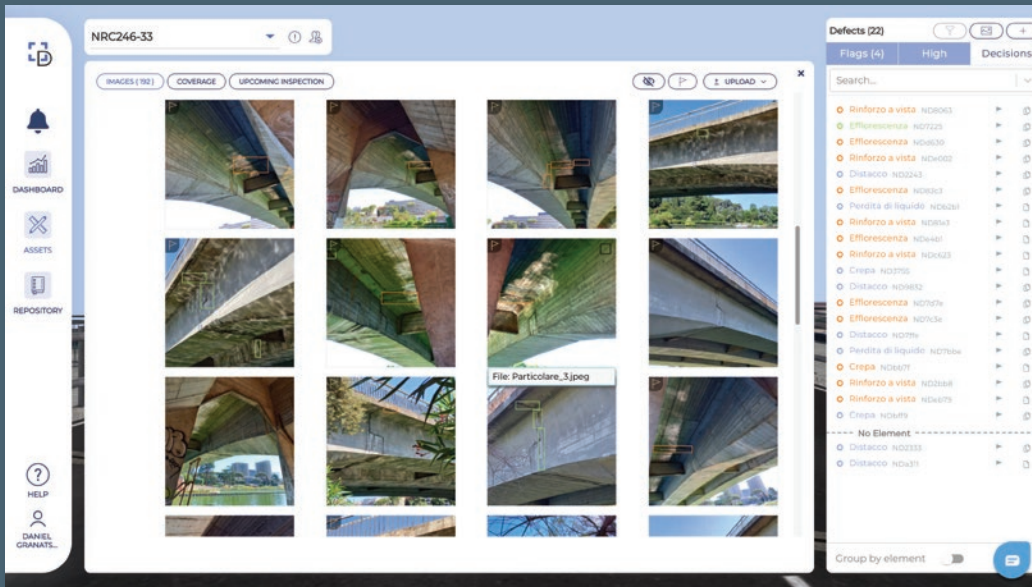
Building on the system’s extraordinary international success, Dynamic Infrastructure and if3 have secured the first Australian contract for the AI enabled bridge asset management system, with Horsham Rural City Council in Victoria now using the Dynamic Infrastructure package for its bridge assets.

Situated in Victoria’s Wimmera region and centred around the city of Horsham some 300 kilometres north-west of Melbourne, the Horsham Rural City Council area covers 4,267 square kilometres and is home to a population of 19,800 – some 75% of which live in the urban area of Horsham.

Home to the Wimmera Intermodal Freight Hub (the central location for container grain handling and grain processors across one of the world’s largest grain, pulse and oilseed growing regions) Horsham is a comfortable three and a half hour drive from Melbourne and four and a half hours from Adelaide on the Western Highway – the main road transport route between the two capitals. The municipality also lies at the hub of the State and National Highway system, providing key road transport routes to Mildura, Portland, Mount Gambier and Bendigo.

As well as providing access for residents and visitors, the city’s road and bridge network provides critical transport and freight linkages for agriculture and other industries. As such, infrastructure asset management and maintenance has always been a key priority for council.





Left: The system builds a 'health record' for the bridge, detailing the type and severity of faults.

Below: Dynamic Infrastructure can also build a full 3D model of the bridge, allow the precise location of faults to be easily identified.

Bottom Left: The system's 'timeline' feature enables users to keep track of faults and check for any escalation in severity. It also allows repairs to be logged when complete so the fault is no longer flagged as requiring attention.

Krishna Shrestha, Manager Strategic Asset Management with Horsham Rural City Council commented:

"We have over 60 bridges - including 28 major bridges - across the municipality. Ensuring that these bridge assets are able to keep up with the demands of increasing traffic numbers and larger vehicle loads is critical to the continued future growth and prosperity of the region."

"With that in mind, rather than following the more traditional 'reactive' asset management and maintenance approach, our CEO wanted us to focus on developing a 'proactive' program which addresses bridge maintenance, remediation and upgrades before major issues arise."

"As well as helping to ensure that all of our bridge assets are able to remain in service, this change in approach allows us to better develop long-term strategies for capital expenditure - whether it's for maintenance, major remedial works or upgrades," Mr Shrestha said.

Needless to say, having accurate and up-to-date condition data for the bridge assets is a critical factor in the success of any asset management and maintenance program. After all, it is all but impossible to budget or plan a path for the future, without accurate information about the current condition of the assets.

The Dynamic Infrastructure system not only enabled the Horsham Rural City Council team to build a full 'health record' for each of the municipality's bridge assets, it also provided them with a timeline that put all of the historic bridge inspection data into a directly relatable context, thereby highlighting any damage or faults that were escalating with age.

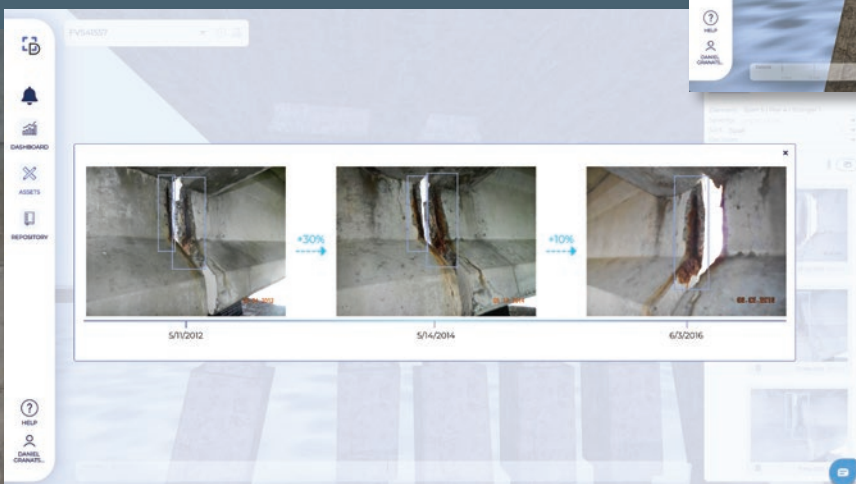
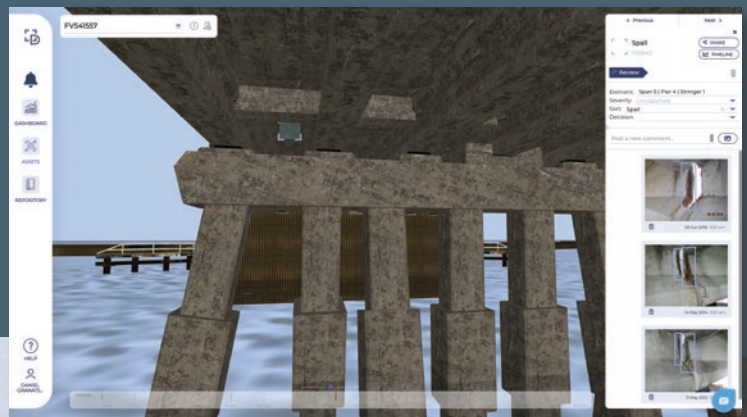
"We implemented the Dynamic Infrastructure package early this year, and even though we've only been using it for a matter of months, everyone is extremely impressed with its performance and capabilities," Krishna Shrestha said.

"The set-up process was extremely easy. We simply provided the Dynamic Infrastructure team with all of the historic data and reports that we have for each of our bridge assets, and they collated these into a full historic record for each bridge."

"The AI system inspected all of the imagery and identified, classified and rated any damage or faults, and then created a record showing the type of fault or damage, the exact location on the bridge and the date of the image. It then produced a timeline for each bridge, which enables us to look at an individual fault across all of the inspections to see when it first appeared, whether or not it's getting progressively worse, or if it's been repaired," he said.

"It really is a remarkable system," Mr Shrestha added. "It has already made a massive difference to our bridge asset management and maintenance operations."

"Not only has it streamlined and simplified all aspects of our bridge asset operations - from inspection, reporting and data management through to budgeting, planning and maintenance delivery - it is also playing a major role in helping us to develop, manage and deliver our 10-year bridge asset works program."



For further information the Dynamic Infrastructure system, please contact the exclusive Australian provider if3 Pty Ltd, T: 1300 552 878 or visit: www.if3.com.au