THE OPEN ROAD

BENTLEY SYSTEMS' NEW OPENROADS CONNECT EDITION IS PROVIDING ENGINEERS WITH A COMPREHENSIVE MODELLING ENVIRONMENT TO HELP ACCELERATE ROAD PROJECT DELIVERY, UNIFYING DESIGN AND CONSTRUCTION PROCESSES FROM CONCEPT TO COMPLETION.

As industry transitions towards a digital engineering approach, where the virtual comes before the physical, embracing building information modelling (BIM) processes and collaborative data environments is becoming more important than ever.

"The whole challenge that we’re facing really is that transition to different workflows and it’s all by industry drivers — that lovely little word of BIM and the impact that that has and what it means to people — and it means different things to different people," Ian Rosam, Director, Product Management, Civil Design at Bentley Systems, explains.

"If you start looking at the level of BIM, utopia is really getting to level 2, level 3 BIM where it’s full ISO standards, object models and its got visualisation capabilities."

He says Australia is already reaching some of these ideal levels, but the next stage is about building on them and addressing evolving BIM requirements.

"With BIM you’ve still got to be flexible because those requirements do change and that’s what we’ve essentially built into OpenRoads Designer — a system that allows you to vary your deliverables and your processes according to the scale of job," Mr. Rosam says.

"We have evolved data formats, big data is coming in in a digital way so the industry is ready for that change. It needs a change because of the type of data and the way they want things to be managed in the future. The old environment we had was a good building block for it, but it wasn’t really geared towards those changing data formats."

"As a culmination of different digital engineering products and software from Bentley Systems, OpenRoads has been designed to simplify digital concepts and data requirements into one easy-to-use package: ‘What you can do with this interface is to stick the likes of ConceptStation (a facet of the OpenRoads package) in front of someone with next to no training and with barely a civil background, and they can start to progress and feel like they’re achieving something from a very touch-screen oriented interface,’ Mr. Rosam says.

"It actually helps bring people in that are new and coming up in the industry. The old guys are old, we’re not getting any younger, so it does help bring in the next generation of designers and this sets them up with much more user-friendly interface they can learn from and rapidly progress on.”

SEEING IS BELIEVING

Dave Body, Senior Industry Strategy Manager at Bentley Systems, says engineers are increasingly geared towards working more visually-oriented models, which he asserts is what makes OpenRoads so appealing.

"You’ve still got to have that engineering context behind it and have that smartness, but it’s the best of both worlds if you can visualise the model much earlier on in the design process. It’s a lot more appealing — everyone can understand it," he says.

"I have this saying: a picture paints a thousand words, a 3D model paints a million, so most people are going to be able to understand a 3D model."

Likewise, as OpenRoads comprises a variety of different, previously independent digital engineering products from Bentley Systems, it provides a more concise platform for designers to use.

"Mr. Rosam says OpenRoads does present the string modelling techniques Bentley Systems has evolved over time, and continues to build on the major principles and fundamentals featured in these previous products."

"Part of the pedigree behind OpenRoads is that it’s based on these engineering work processes established in the past and it builds on those to adapt to new requirements and modelling environments," he says.

"OpenRoads puts the design in context, somebody can understand the road surface, whereas they can’t necessarily understand strings. This actually streamlines the modelling process as well so it greatly simplifies it and allows you to rapidly progress traditional design to the point that you are reducing weeks down to days, days down to hours and minutes — there’s a big efficiency gain in terms of the modelling process."

"Mr. Body adds that by streamlining the design process, it can also mitigate the risks and costs associated with the handover process from designer to contractor to operator-owner.

"Traditionally, the construction contractor would take the design from the designer and redesign it, or remodell it for their own purpose, and that just introduces a huge amount of risk,” he says.

"That is a huge pinch point — it’s time consuming, it’s costly and it introduces a hell of a lot of risk. With our strategic partners, we’re trying to eliminate that.”

SHIFTING REQUIREMENTS

As expectations for engineers and project contractors to do more with less increases, and with limited resources, Mr. Rosam says there is a need for industry to embrace BIM and the digital processes embodied by OpenRoads to stay ahead.

"It ties back into the changing requirements in the market and the expectations around BIM. What is BIM? What does it means different things to different people," he says.

"In some respects, some of the roles of the engineer and the draftsman are blurring as well. The fact that you can achieve automation with your drawings on the back end changes the role slightly in some situations.” Mr. Rosam adds that it’s both a good thing and a bad thing — some will argue pros and cons for that but it does allow, in either role, the ability to broaden your scope.

"For a designer to be able to produce a visualisation model, it provides benefit to that design organisation. The same goes for drawing productions and automation-drawing production and automating updates for those to deal with and action the changes. Adapting to change is one of the key aspects and significant benefits OpenRoads is bringing.”

Reducing costs on things like rework when change orders come in, for instance, is one area where OpenRoads can meet new expectations of project delivery and doing more with less.

"If you’ve got the ability to have design intent ripple and adapt to change and have that propagated quickly and efficiently, essentially it reduces averages and costs for rework and change. It could potentially help mitigate some of the claim management you have for change orders on jobs,” Mr. Rosam explains.

"Because you’re always going to have change on a job, there are situations you can’t account for. So, you’re going to have to react to that and efficiently turn that around, especially if you’ve got a machine out there sitting and costing a few thousand dollars an hour,” he says.

"Because there are changes coming in you’re going to have to get that information out efficiently. So, being able to have that intelligent update and react to that is critical.”

MEET PUBLIC EXPECTATIONS

With not only pressure to provide more concise workflows, a shifting emphasis towards more integrated community and
stakeholder engagement on project delivery. Mr. Body says the expectation to provide clear and concise information to the public is increasing.

"There's the whole theory of the unknown -- you could tell the community there's a bypass coming in and they might say, 'We don't want it,' but they don't know what the impact is," he says.

"If you can demonstrate to them the impacts, obviously some people will go: 'that's more impact than I thought it would have,' but on the flipside, they're informed -- informed on what it all is about and they can then make an informed comment."

Mr. Rosam says OpenRoads helps address that shifting emphasis toward more integrated stakeholder engagements, giving designers the ability to quickly and efficiently provide an accurate visualisation of the project.

"We use the phrase design time visualisation, which is just a byproduct of the design process. From the get-go, you've got material on the surfaces of the model so we can immediately switch from a rendered view," he says.

"You can then combine that with a reality model and even into a virtual reality simulation, so you can put the person into the situation where you can show them what the projects going to look like, and they understand that visualisation easily."

LumenRT, as part of OpenRoads Designer, allows the designer to render cinematic quality in real-time, animate models and incorporate other aesthetic elements such as digital nature and moving cars, for instance.

"It can get people on board -- they can walk around it, look at the 3D PDF out of LumenRT and they can see the impact immediately. It can put people's minds at rest and that's an important aspect of stakeholder engagement," Mr. Rosam says.

"It can alleviate their concerns as well, which can potentially help reduce costs. If you're sharing that information upfront and people can understand it, it could help reduce objections and streamline some of that process of public consultations."

TAILORED TO THE MARKET

Key to the roll out of OpenRoads in Australia and New Zealand has been its uptake within the local market. Mr. Body says in Australia, at the government and private sector level, the industry is still trying to define what BIM and digital engineering really means for infrastructure.

"We understand the big picture, but it's the details that governments and owner-operators are still sort of working out -- what BIM really means and what value they can obtain from that," he says.

"To facilitate understanding and provide OpenRoads as a tool to guide progress, Bentley Systems launched an ANZ workspace. Developed in collaboration with representatives from early adopters of the collective OpenRoads software -- including New South Wales Roads & Maritime Services, VicRoads, Main Roads Western Australia, Becc, Arcadis and Bentley Systems -- the workspace provided a unique space for collaboration and establishing the standards for the digital workflows used in OpenRoads.

"The core OpenRoads is a global product but there's regionalisation that has to occur and that's to achieve regional standards. In Australia, what we've been doing is engaging with the different authorities who all have their own individual standards through the ANZ workspace," Mr. Rosam says.

Mr. Body says that it's generally the governments that lead the industry in terms of embracing these concepts, and they are the ones who are key in its progression here.

"State governments are generally the owner of the infrastructure, so I think, as an industry, whether consultants or contractors, they're looking for government to lead in this, so they understand what they need to deliver," he says.

"We can build a road no problem, but it's the information that they want at the end, after the project delivery through into operation and management phase, and the government's really got to take the lead there."

"Mr. Body says some of the larger construction contractors are taking the lead in BIM and digital workflows adoption, but they're taking the lead in how they want to complete their individual projects."

"I'd like to say we're in this twilight zone between the old and the new and, to me, it seems that everyone is looking for that direction," he says.

"We've developed software where we can provide that capability, but, at the end of the day, we need to understand the needs of the market."

Mr. Rosam says this understanding comes down to the varying standards and definitions of BIM to different people. "People want it to be defined and that ties back into the ANZ workspace, which we've provided to actually allow them to do the modelling to a defined standard, and it gives them a good segue into understanding and adopting those processes," he explains.

Mr. Rosam adds that a major step forward for BIM and digital engineering adoption in Australia is having the different state government bodies working in the same space.

"Not only is it helping to simplify the process for designers and consultants working across state borders but it helps avoid confusion as well. All of them have their own individual standards, so getting them to work together and to agree on a generic standard that can be applied across Australia provides significant benefits as a whole."