



CONSTRUCTIONEERING: THE FUTURE OF GLOBAL INFRASTRUCTURE

CONSTRUCTION IS ONE OF THE WORLD'S LARGEST BUT LEAST AUTOMATED MANUFACTURING INDUSTRIES. TO REALISE THE EXPECTED RAPID RATE OF INFRASTRUCTURE GROWTH, THERE NEEDS TO BE A RADICAL SHIFT IN THE WAY PROJECTS ARE HANDLED. TOPCON'S **RON OBERLANDER** EXPLAINS HOW TECHNOLOGY CAN HELP BRIDGE THE GAP BETWEEN THE RESOURCES WE HAVE AS AN INDUSTRY AND THE VOLUME OF WORK THAT LIES AHEAD

Thanks to increasing population density, coupled with urban growth and the modernisation of developing regions, the construction industry is on a strong upwards trajectory. In fact, by 2030, the value of the global construction market is expected to have risen by US\$8 trillion. That's according to the Global Construction 2030 report, which also forecasts that the volume of construction output will grow by 85 percent to US\$15.5 trillion worldwide in the same timeframe.¹ However, achieving this growth will not be without its challenges. With limited resources, we need to manage projects as efficiently and as cost-effectively as possible, and providing the industry with access to the technology, data and education needed for a productive workflow will be integral to this.

Improving workflow

A variety of factors account for inefficiencies and under-budgeting, including poor organisation and planning, inadequate

communication, errors in prioritisation and contractual misunderstandings. The traditional project lifecycle – planning, surveying, design, layout, execution, inspection, maintenance – is fraught with the potential for dips in productivity, primarily because it relies on data being transferred between different independent entities at each stage.

To help tackle this issue by increasing productivity and minimising data loss, Topcon has collaborated with Bentley to develop 'Constructioneering' – a concept that aims to automate the digital construction process and improve the data flow throughout a project. This involves surveying, engineering design, constructible model development, and as-built data collection within a connected data environment to improve construction execution and reduce project costs.

Technologies that can help to achieve this include Topcon MAGNET® Enterprise, the ecosystem that connects all elements of a project, and ProjectWise from Bentley,

which has similar functionality. The software creates a digital twin of a construction site, which can be updated in real-time with data from the design as well as from data on-site. The software can also be integrated, so Bentley or Topcon users can use either platform without noticing a difference.

Linking Infrastructure and Technology

To keep pace with the demands of a growing global infrastructure, the construction industry needs to position itself at the forefront of technological innovation and boost productivity by applying advanced positioning technology. This is what we call the Intersection of Infrastructure and Technology – where infrastructure opportunities and technology come together to meet future demands.

At Topcon, we've spearheaded innovations over several decades that increase efficiency in all aspects of infrastructure development.



Above: Already on offer in North America and Australia, Constructioneering Academy courses are now being extended to Europe

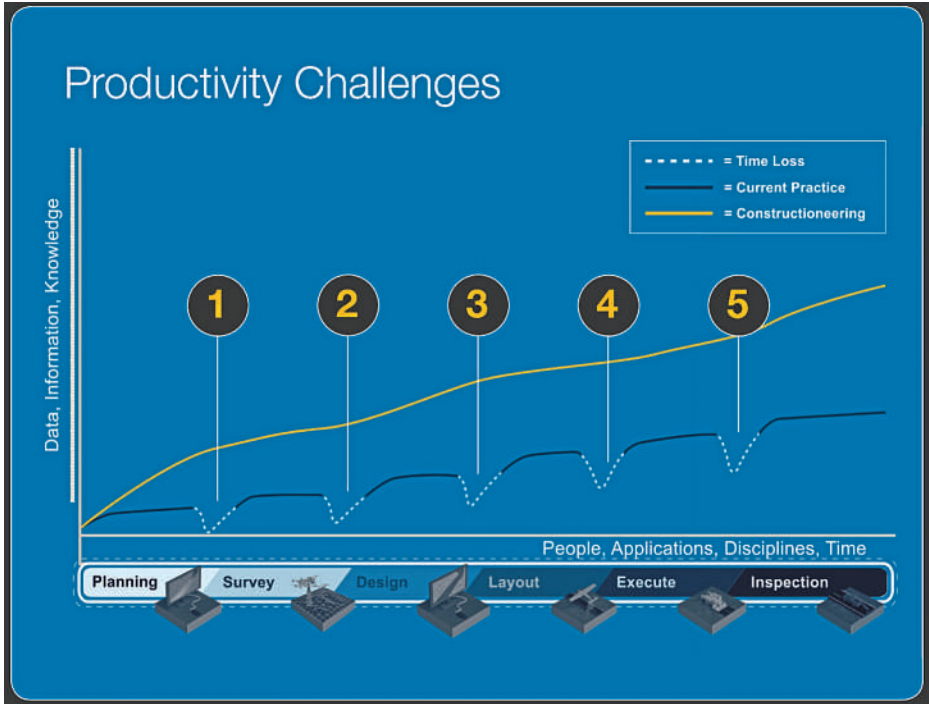
From land surveying to automated machine guidance, these innovations now include data workflows and process control of development projects. Seamlessly integrating these innovations into the workflow to deliver immediate results is key to meeting the future demands of the construction industry.

Constructioneering through education

The existence and continuous evolution of these technologies won't solve the problem alone. For them to have an impact will require appropriate training to equip users with the latest know-how. This year marks the first anniversary of the launch of the Constructioneering Academy, an initiative set up by Topcon and Bentley to educate civil design build professionals on the digital construction process. As part of the programme, attendees learn how they can leverage mass data, digital cameras, design models and automated machine control to win more work and execute their next project more efficiently.

The course aims to create awareness of potential productivity gaps that can be encountered on a project and how those gaps can be filled, resulting in a paradigm shift in how work can be accomplished. An integral part of the initiative is the interaction of field and office professionals from the 'front lines' to ensure data is shared effectively and efficiently through entire workflows. So far, courses have been conducted in multiple locations across North America and Australia – attracting more than 80 companies, governmental agencies and organisations – and are now being extended to Europe with the first London-based Constructioneering Academy.

Through the Constructioneering Academy sessions, Topcon has listened to and worked with a wide variety of companies and professionals to identify



Constructioneering smooths the peaks and troughs of current practices to boost efficiency and productivity

productivity gaps that occur between each phase of construction projects. Based on these insights, Topcon has been able to formulate packaged solutions that deliver immediate improvements in productivity.

The future of global infrastructure

The need to address and improve construction processes at a global level has never been more pressing. With the added pressure of finding the US\$36 trillion monetary gap to pay for expected necessities globally, and the UK's need to find £250 billion of investment between 2018 and 2023 according to the Institute for Government think-tank, strategies to improve productivity and cost-efficiency are of paramount importance.

The main aim set out in the Global Infrastructure Hub Strategic Plan for 2019-2022 is to address current information

asymmetries and promote collaboration in order to bring resource and workload more in line with each other. Only by providing the industry with clear guidance, data and tools to support transparent procurement and effective project implementation, will we be able to streamline the infrastructure project lifecycle and rise to the critical challenges we face as a global community.

1. <https://www.ice.org.uk/ICEDevelopmentWebPortal/media/Documents/News/ICE%20News/Global-Construction-press-release.pdf>

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