Institution of Civil Engineers

Knowledge

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Digital Transformation Insights

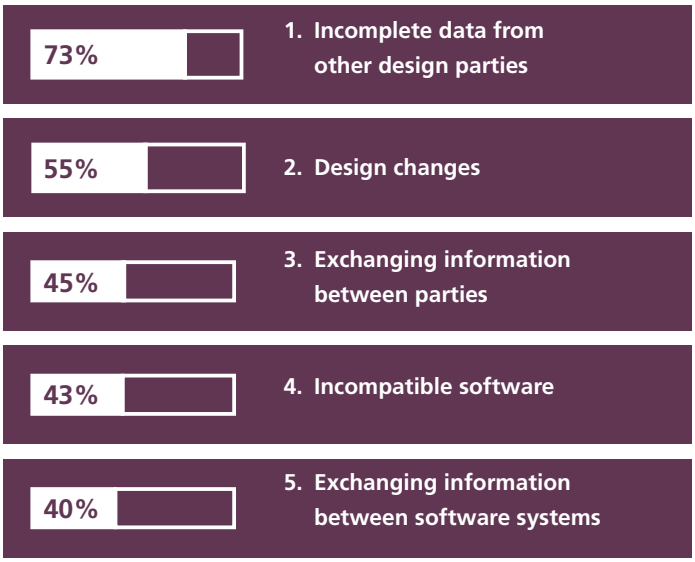
Breaking Barriers in BIM

This briefing report outlines the latest trends, perceptions and barriers around the implementation of BIM (Building Information Modelling) as identified from a recent survey by ICE and BIM software provider ALLPLAN UK, and sets out expert recommendations for addressing these barriers.

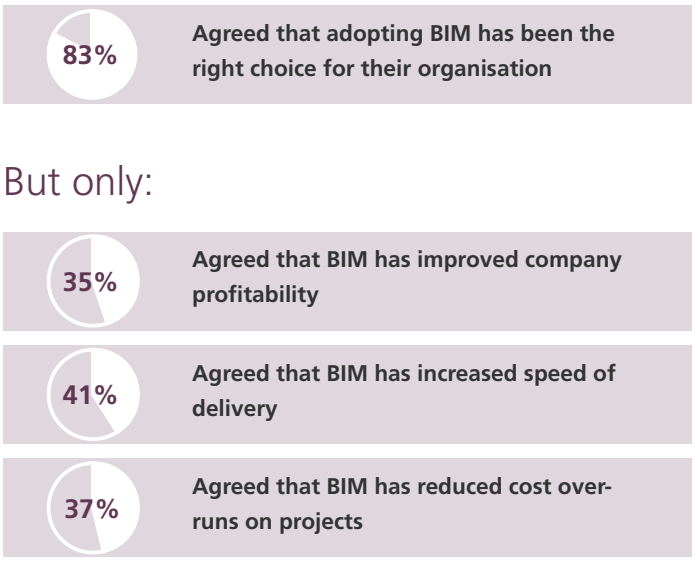
Survey findings

ICE and ALLPLAN UK surveyed 250 ICE members to measure the profession's latest progress implementing BIM. The survey sample included civil engineers, technicians, designers and consultants from a variety of organisation types. Experts in BIM ranked the sources of errors that lead to increased risks in projects:

Which factors best describe the sources of errors that lead to increased project risk?



Do you think that BIM has benefited your organisation?



Breakdown of survey findings & underlying issues

Incomplete data from design parties & design changes

- This has long been a causal factor of delays, cost overruns and rework within projects and clearly still prevails. Quality of data and availability of data remain key issues, but designers and suppliers are not necessarily to blame.
- Often, information requirements are not clearly set out in contracts, and infrequent clients are often not educated on what "complete" means and what the ramifications are if not specified.

Exchanging information & incompatible software

- Digital tools have evolved, and we now have powerful software available to deliver the outcomes we need. While some software systems could be more user-friendly and tools are not always in line with standards, the issues are much more to do with people and processes.
- There remains a lack of full understanding about project workflows and we lack skilled people who really understand how to build and interrogate datasets. Practitioners are commonly comfortable working with 2D documentation and using 3D models to assist, but it is less common for practitioners to be fully able to check and approve deliverables in full 3D.
- Vendor lock-in remains a major issue, and many organisations could do more to fully research the right tools to deliver the outcomes they need before making long-term financial commitments to suppliers.

Key Recommendations

ICE and ALLPLAN UK convened an expert roundtable to debate the findings and underlying factors, and set out next steps and recommendations for industry to break down the barriers revealed.

1. Continue to develop an information culture within civil engineering, that reflects an understanding of both whole-life infrastructure management and outcomes to society.

2. Find new and better ways to share knowledge on information management, enabling real learning from both successes and failures, and of how digital tools and good information practice have enabled growth, especially within smaller enterprises.

3. Investments in BIM tools and other digital solutions must be well considered and based on sound understanding of both engineering and technology, to ensure that outcomes can be fully met.

4. Invest strategically in both people and information processes, to drive more value from technology across whole life performance.

5. Clients, especially infrequent ones, would benefit from clear "how-to" guidance on setting project specifications, information strategy and information requirements across the life of projects.

Roundtable attendees

Ralph Pullinger
International Technical Manager
ALLPLAN UK

Lewis Wenman
Lead BIM Manager
Bouygues Construction UK

Karen Alford
FCRM & Asset Data Lead
Environment Agency

Professor Tim Broyd
Digital Transformation Ambassador
Institution of Civil Engineers

Peter Austin
BIM Manager
Kier Group

Dr Sas Majlessi
Director, Transport Infrastructure
Pell Frischmann

James Daniel
Head of Digital Engineering
Skanska UK

Sean Daly
Director
Solid Structures

Scott Bennison
Digital Operations Manager
Vinci Construction

Addressing barriers

It's worth remembering that while BIM tools have been around for decades, it's only been three years since the UK Government's mandate. And while great progress on digital transformation is being made within civil engineering, it has also not been long since construction was infamously ranked by McKinsey as one of the worst-performing economic sectors on digital adoption.

It's likely that many infrastructure organisations remain on a journey to realising best value from digital tools, and we may expect that if we ran this survey in 5-10 years' time, naturally more organisations will be seeing differences to their bottom lines of profitability and speed of delivery.

However, we must continue to find ways to actively drive adoption and tackle some of the barriers.

Share knowledge

The civil engineering profession must get better at sharing both good and bad experiences of managing data and information flows, and we must find more effective ways to apply learning within organisations and draw learning experiences out of organisations.

Real lessons are crucial to engendering practitioner confidence and helping organisations see value in digital tools, all the way down the supply chain. ICE has a key role in disseminating knowledge and continues to do so through its Digital Transformation campaign, but as an industry we must become more open about sharing both successes and failures.

Make sound investments in software and people

To help avoid negative impacts of vendor lock-in, investments in software and other digital tools must be well considered. Organisations must ensure that decision-making capacity is supported by strong knowledge and insight in both engineering and technology, and extensive time should be spent researching available tools to understand which can best deliver required outcomes. Informed decision making is crucial to maximising value from digital tools, especially over the whole life of an asset.

Infrastructure organisations must also invest in the right expertise to maximise the value they can get from information. As set out in ICE's 2018 Professional Skills report, our approach to solving the skills challenge must recognise that civil engineering is about managing and operating infrastructure as well as designing and building it, and that civil engineering skillsets must be able to adapt and evolve to get the most value from new technologies and the information it presents us with.

Demystify BIM for clients

It's crucial that clients, especially one-off or infrequent clients, understand their role in setting project and asset specifications, information requirements upfront, and implement validation and verification processes at handover stages. Clients must recognise the importance of this in avoiding rework and cost overruns, and ensuring supply organisations work towards the required outcomes.

Early engagement and close ongoing communication with the supply chain is important, as set out by Project 13's Capable Owner model. To support this, clients (especially infrequent ones) could benefit from clear "how to" guidance on how to set information requirements and apply standards to help deliver the outcomes they need. This could be based around three key areas that must be fixed from the outset: completeness, consistency and accuracy of information.

Professional skills report

Project 13's

We need more case studies of how BIM and other digital solutions have helped save money and led to growth, for large and small enterprises alike. These success stories are crucial to building the business case for digital solutions, together with informed decision making.

If you have a story that ICE could share, please get in touch at dt@ice.org.uk.

ICE Knowledge

Follow the debate:
Joint ICE-ALLPLAN UK webinar
Breaking Barriers in BIM | 15 May 2019

Join us at
Digital DNA
Belfast | 18-19 June 2019

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