

Applying Building Information Modelling across the Infrastructure Lifecycle



Developing a Building Information Modelling strategy to ensure compliance and identify market opportunities in other infrastructure sectors.

The Government Construction Strategy published in May 2011 announced that the use of Building Information Modelling (BIM) will be compulsory on all public construction projects by 2016. The key objective of this sector modernisation programme was to reduce the capital cost and carbon emissions from the construction and operation of the built environment by 20% through using more efficient methods.

BIM is a collaborative way of working, underpinned by digital technologies which unlock more efficient methods of

designing, creating and maintaining our assets. BIM embeds key product and asset data in 3D computer models that can be used for effective management of information throughout a project's lifecycle – from earliest concept through to operation. BIM is not only a game-changing information and communications technology solution for the construction sector, but also promotes a culture of collaboration across the sector. (Government Construction Strategy).

Adoption of BIM by organisations will be essential to survive and successful early adoption will lend a strong competitive advantage. Government policy is that BIM is required for both buildings and infrastructure projects. However, its application to linear infrastructures such as road, railway and water assets is much less mature.

What the IDC did

The challenge for the IDC was to understand what it would mean for WSP to apply BIM techniques to rail, highways and power networks markets and how to do this most successfully.

The IDC undertook qualitative research using a combination of grounded theory, applied action research, comprehensive academic and trade literature reviews, case studies and expert workshops to understand the implications of moving BIM into different infrastructure environments. The research comprised 3 main strands:

1. Understanding the process of infrastructure project delivery.
2. Understanding best practice on information systems implementation in a range of sectors.
3. Proposing a framework to facilitate effective decisions around the appropriate application of BIM and information systems on infrastructure projects.

The Research Engineer (RE) was exposed to half a dozen ongoing projects within the company to understand current approaches. As the research progressed, the scope of the project narrowed and focused on the area of highways construction where the track record of BIM application is not strong and the fundamental understanding is immature. Furthermore, given that the researcher was embedded in the company as it explored new BIM applications, it provided opportunities for the researcher to investigate how the organisation approached, learned and managed novel applications of BIM to inform future applications.

The project helped deliver BIM compliance for WSP. In addition, the project also identified some of the potential challenges in using BIM to underpin a system that will support through-life management of linear infrastructure assets, particularly when they are constructed in phases.

The Impact

The outputs of the project have secured the company's market position for delivering Government projects and provided insights into other potential markets:

- The IDC researcher has been recruited by the company to develop further the outputs of the research and examine new service offerings around BIM and information management to support key national clients.
- The fundamental research and insights are being used for teaching purposes on a leading University construction course.
- The outputs of the research are helping create a benchmark for the use of BIM in the highways field.
- The IDC researcher gave the keynote address at the prestigious ARCOM 2016 conference in Manchester.
- The outputs of the project have been instrumental in developing a framework for WSP's Digital Highways Strategy which will be used with clients from 2017 onwards.

The Future

A number of academic papers will be published from the research in 2017 to raise the profile of the project and promote WSP's expertise in the area. The company are seeking to undertake further investment in BIM and the research outputs to develop new service offerings reinforcing their market position. The company has agreed a development plan to broaden the experience of the IDC researcher and support the active role that he is already playing in the wider industry. The RE has published a white paper on BIM for Civil and Structural Engineers for the BSI.

Related publications

Bartley, T. 2017. BIM for Civil and Structural Engineers, BSI/UK/1054/ST/0328/EN/HL

