# What does BIM mean for structural engineers?

**Graham H Stewart, Digital Director at Digital Guerrilla (former Ramboll UK Head of BIM)**

Building Information Modelling (BIM) allows those **involved** in the design and construction of buildings to model them first in digital form. This means all stakeholders can interact with the building more efficiently and, in theory, improve the building's design and longevity. BIM effectively provides the answers to three simple but crucial questions when designing buildings: what are we doing? Why are we doing it? And when are we doing it?

BIM is therefore clearly a hugely powerful tool. It is also, however, often too easy to pay lip service to the software without being clear on what tangible benefits it offers to clients.

BIM has played a critical role in three projects in which I have recently been involved: the Royal National Lifeboat Institution Headquarters, Kings Cross Central development and Birmingham City University campus. In all three, BIM has delivered a number of different advantages to clients.

**The Royal National Lifeboat Institution All-weather Lifeboat Centre**

Ramboll acted as lead designer on the RNLI's All-weather Lifeboat Centre in Poole – giving them a modern lifeboat manufacturing facility to service the RNLI's requirement for the next 30 years. This was a particularly ambitious project providing capacity for the construction and fit-outs of lifeboats as well as office space and a canteen.

For this project, we used BIM for the purposes of clash detection. Placing the architect's models into the BIM software allowed us to analyse vast quantities of data automatically and to identify and mitigate potential clashes months in advance of construction. This is a major advantage as the earlier these problems are caught, often the easier and cheaper it is to solve them.

The software automatically dictates problematic elements by highlighting soft, as well as hard clashes. By entering different variables into the software, we can programme it to identify and flag, for example, a structural support sitting in front of a doorway.

This clash detection system eliminated the need for an analysis of 2D and CAD drawings and, although a visual verification was still required, saved 70-80% of man hours that would have otherwise been required to complete the process.

**Kings Cross Central Development**

Ramboll is currently playing an important role in the Kings Cross Central development, where innovation on a number of the buildings has been instrumental to their success. Situated on an ex-industrial site, the development sits adjacent to the High Speed One railway and above Network Rail Thameslink tunnels.

The development is currently one of the largest urban construction site in Europe, with its sheer size and complexity meaning that effective collaboration and communication is vital.

As part of the design, coordination and analysis Ramboll has produced 3D models on all of our projects on Kings Cross Central to date in order to produce the design deliverable. These have provided a significant part in the design coordination, not only for the buildings themselves but also in analysis and review of foundations in close proximity to adjacent railways and tunnels. In addition, these computer generated models were also utilised for site logistics meetings where they assisted the coordination between three contractors working on three adjacent plots. Ramboll is now continuing to deliver BIM models for a number of newer plots on the development, which will be used throughout design and construction, ultimately providing a 3D model for the facility managers when the buildings are complete.

**Parkside Building, Birmingham City University**

Completed in 2013, the Birmingham City University (BCU) Parkside Building is a new centre of excellence which offers technology-based arts and media provision and includes TV, radio and photographic studios to support the full range of academic courses for the School of Art and the Birmingham School of Media. These disparate needs created a complex and multifaceted structure.

BIM software allowed Ramboll to upload asset management data providing a complete 3D model which could be viewed onsite on a tablet computer. All drawings were marked up and sent to a data cloud giving the client a complete operation and maintenance database.

This not only significantly sped up the client's understanding of what needed to be done on the site but also saved the client from employing a facilities management operator.

**Conclusion**

BIM clearly improves communication and knowledge sharing, allows us to make savings on time and money, and to build better buildings more efficiently. Despite the fact that BIM has become a standard industry practice, we often fall down in communicating its advantages clearly to clients.