

MAKING BIM WORK FOR BALFOUR BEATTY



A Principal BIM Integrator with over 35 years' Civils experience in design consultancy and construction, Scott Kerr has been closely involved in the integration and implementation of BIM technology in leading UK contractor Balfour Beatty's construction delivery processes for the past five years. He has supported the use of BIM on many major projects and programmes, most recently managing the 4D modeling and implementation used on site as a support tool for Balfour Beatty's construction planning, delivery and logistics management on the Heathrow T2B project.

At both the APS Convention in Edinburgh in October and a month earlier at the APS-sponsored BIM 4 Health and Safety Conference in London, Scott presented a clear and emphatic demonstration of just how effective digital modelling could be in securing better outcomes on site from health and safety design risk management.

"Balfour Beatty has been using BIM in the H and S context for the past five years to help deliver our Zero Harm Roadmap – that's the company's commitment to eliminating risks to workers and the public on our projects. It has also been a very successful tool in helping us fulfill our Principal Contractor duties under CDM 2007, and we believe it can play a major part in achieving the objectives of the recently introduced CDM2015 Regulations.

"In our experience, the multi-dimensional aspects of BIM and the associated digital technologies offer a whole range of benefits in identifying and designing out issues that could otherwise create risks in the construction, operation or maintenance of a building or facility."

3D BIM Benefits

There are four principal uses and benefits of 3D digital modeling, says Scott Kerr:

1. Safety by design - Virtual Prototyping
2. Safety Visualisation
3. Virtual Compliance and Testing
4. Operational Simulation

3D modeling has proved invaluable in engineering out safety risks in pre-fabrication design and assembly, for example, and in the virtual design of better and safer construction processes.



It allows potential safety risks on site to be visualised very clearly, to show potential hazard zones around construction plant and machinery, for example, and it

enables designers and contractors to simulate operational procedures to check that they are going to work as intended and without risk before construction.



Steelwork Erection in conflict with Concrete Construction

4D BIM Benefits

- Practice and review processes at the planned time of activity/delivery/installation
- Virtually assess and optioneer delivery routing for clearances/constraints and potential risks
- Define and design associated temporary works
- Identify and understand future maintenance requirements and constraints
- Validate and check operator control procedures/methodologies
- Test for compliance and adherence to legal requirements



Balfour Beatty

4D = 3D + Time

Scott Kerr's most recent development of 4D BIM applications on Balfour Beatty's Heathrow T2B project shows the potential of the added dimension of time to further enhance health and safety risk management.

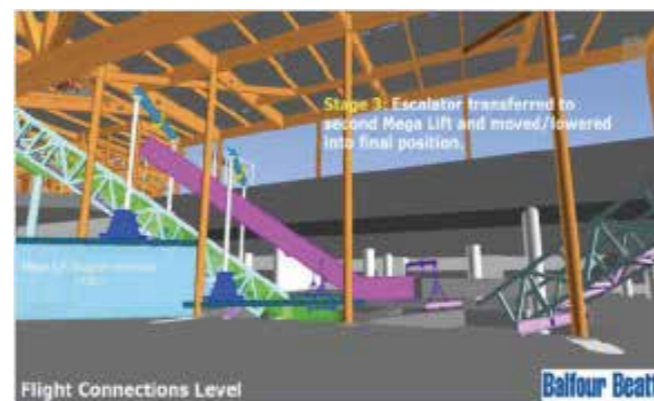
"We have used 4D digital modeling to simulate construction procedures, including temporary works. It has helped identify and eliminate potential safety risks that could jeopardise the site operatives involved, and also potential conflicts in time and space, clearance issues and other constraints that could otherwise have had a significant impact on schedule and costs."



Communication

Perhaps most importantly in the context of managing health and safety risks, says Scott Kerr, digital modeling and virtual reality offer a clear, high impact means of communicating potential health and safety risks to the people they most affect,

"Human beings absorb information visually far more readily than in any other way. A picture paints a thousand words. With 3D and 4D modeling we can provide the clearest visual risk warning information, we can show people exactly where the risks lie and how to avoid them. We can rehearse and test processes virtually so they understand precisely how they work in space and time, and we have found that we benefit from feedback at this stage that helps us eliminate risks and improve efficiency."



Flight Connections Level

The development and application of digital technology like BIM raises a number of fundamental questions for the construction industry. Does it add value? What are its costs/benefits? Is it accessible and practicable for smaller organisations and projects? We asked Scott Kerr...

Has BIM added value in terms of H&S outcomes, and if so, how?

Introducing BIM has resulted in a vast improvement in risk integration, awareness and understanding of the potential issues that would be encountered on site, prior to any commencement of works.

Using BIM to its full potential has opened up a new communication channel between all the project stakeholders who are office based and those working directly on the site, with increased familiarisation and understanding of known issues and risks highlighted and identified as part of the virtual build through the 4D work. This channel also comes to the fore with the provision of data that is integrated with facilities management processes to ensure a comprehensive set of asset data for handover, which identifies the ongoing Health and Safety requirements during operation, especially around operator maintenance.

We measure KPIs in a series of core areas to track the value of BIM implementation on a project. Many of these demonstrate its value in terms of productivity, efficiency and delivery.

In terms of health and safety outcomes, our measurement has demonstrated that there are typically far fewer RFIs on a BIM project.

What challenges and problems have you faced with implementing BIM?

Like most of the Industry we are developing and implementing our BIM processes/initiatives in response to the UK Government's 2016 BIM mandate and the 2025 Construction Strategy, but this is being constrained by the availability of technical resource and the widely held view that the full benefits promoted have not been fully proven yet through the transition from design to construction delivery. The increasing digitisation of the construction process in general is going to drive wider adoption of BIM, along with the Government mandate (push) and growing recognition of its value from the Industry and Clients (pull).

How do you think BIM will work (or not) at smaller project/user level?

Full implementation of BIM is not really practical for a small project but it must be noted that the discipline of safety and risk management are equally important on a small project as well as on a large multi-million pound capital project.

But any element of BIM described in this article could be used to support the safety discipline irrespective of the size of the project. All those involved in the process of design and follow-on construction – starting with the Client – have a moral obligation to ensure safety is central to the process that they are involved in. When a BIM process or use of technology can help to develop this more efficiently and effectively then it should be adopted.

Next issue: How does it work for the Client? And how do you access the technology?

