

**CS226369**

## **Digital Field Management with the BIM 360 Classic and Next-Generation Platform**

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### **Learning Objectives**

#### **Learning Objective 1**

Learn about BIM 360 classic and next-generation implementation

#### **Learning Objective 2**

Learn about digital field management

#### **Learning Objective 3**

Learn about workflow of data during construction

#### **Learning Objective 4**

Learn how to save delivery time by using technology

### **Description**

Ever wondered how to deploy the BIM 360 platform onto a live construction project. Sit in on a case study and informative technical presentation on the largest higher-education construction project in the United Kingdom. Learn how Excitech and Balfour Beatty have deployed BIM 360 classic and next-generation platforms as a platform to support the digital vision of field management and digital construction, to deliver many benefits and increase visibility across the project, yet at the same time de-risk the project and increase quality in the delivery. From the initial uptake of the design intent models to the collation of asset data during commissioning, see and learn the processes and workflows established. See how bar codes are helping navigation and management of the project assets on the site, but don't think of assets as just mechanical and electrical plant items, see how people and temporary site equipment are also being considered.

## **Speaker(s)**

### **John Williams**

John has fulfilled many roles within Excitech (UK Autodesk Platinum Partner) from supporting the digital design and delivery at Heathrow Terminal 5, implementation of an enterprise wide EDMS at the Atomic Weapons Establishment, heading up the Data Management and Consultancy teams and currently a Project Director responsible for the implementation of an enterprise wide CDE for Heathrow.

Being able to confidently use data – gathering, storing, and sharing it in line with industry standards and compliance regulations – is rapidly becoming a critical component in effective collaboration across every stage of the construction process, from design to build and handover. John has built a reputation for a pragmatic approach to consultancy delivery with a focus on value and this presentation will demonstrate how an industry experienced team, with the right technology can meet and exceed customer expectations.

### **Steve Rudge**

Steve is coming to his tenth year working for the largest Autodesk Platinum Partner in the UK (Excitech) and during this time has been able to capitalize on years of industry experience in pioneering integrated modelling processes on major UK construction projects. This has given him great insight into the specific benefits that the BIM process can bring to all stages of construction, and furthermore enables him to provide sound guidance on how this can be successfully applied to the operations of a contracting organisation.

This experience has led to recent successes where Steve has helped several major contractors develop their BIM capability and he has been heavily involved in supporting the project bid process managing BIM execution plans, protocol and ensuring the clients requirements to BIM are fully achieved. BIM needs to cover all phases Design, build and manage, Steve has experience in all three from COBie drops and extending the use of BIM to support on-site activities through handover to the operations phase.

Steve has a unique insight and technical understanding of the primary design and construction applications that are utilized within a BIM environment. This understanding enables him to work across the extended project team to ensure that information can be effectively coordinated during the design stages, prior to the data being harnessed to best effect during the construction stages. In addition to his extensive knowledge of the solutions that apply to key construction activities, such as estimation, planning and field data capture – Steve also has specific skills in providing detailed assessments and developing accurate process workflows to inform each organization's BIM strategy.

Now working as the project BIM manager on the MECD scheme, Steve and the Excitech team will hopefully show you during this presentation some of the processes and technology that has been put in place.



## **Digital Construction on the Manchester Engineering Campus Development (MECD) Project**

Manchester University is the biggest university in the UK. The site is vast but slightly fragmented as a campus so they are developing the area next to the Manchester Aquatic Centre. This area will host four new buildings - the Mec Hall, Old Fellows Hall, Upper Brook Street and York Street.

### **Quick overview of the project**

The costs associated with this project are £287 million, covering 78,000 meters squared which is about the size of 11 football pitches. *“It’s a highly complex building because it includes numerous laboratories and lecture spaces so the building services side of the project is very complex.”*

6,750 students are to be accommodated in this new university block. It is the largest construction project undertaken by a higher education institute in the UK.

Excitech has been engaged with the university since 2011, before PAS1192 was introduced. The university had a vision of implementing BIM and the benefits of collating asset data during the design and build process.

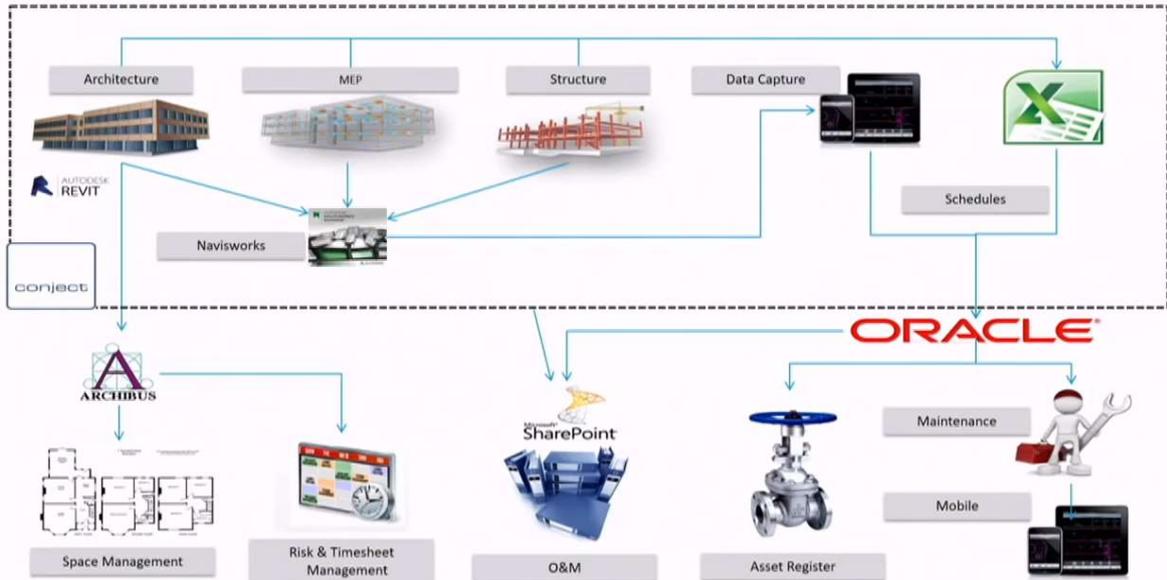
The project was awarded to Balfour Beatty in 2017 but the contractor had been engaged in the process since 2016. The construction and early works are underway, and handover is expected to take place towards the end of 2020.

More project details can be found here <http://www.mecd.manchester.ac.uk/mecd-project/>

### **Project Key Deliverables**

Manchester University recognises the benefits of digitizing construction and putting digital workflows in place. The university are keen to take control of the models after the project is finished. They want a clash resolved model which needs to be accurate to help maintain the facilities going forward. And they want everything stored in their own CDE system - Conject.

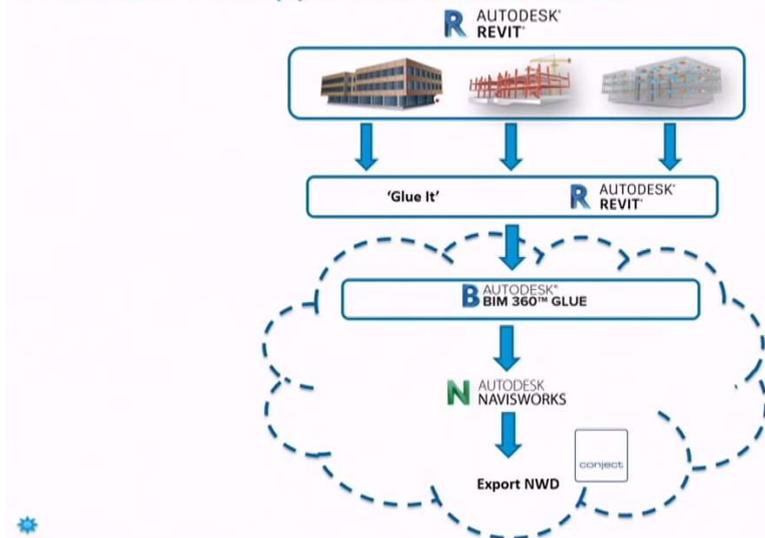
## Information Requirements



The area around the top and within the dotted box represents what is going into the CDE area.

The above picture shows the models that are being created using Navisworks and bringing information in from the field on iPads and intelligent spreadsheets through solutions such as [Ideate BIMLink](#). All this information then has to go into two university systems, Archibus for space management and Oracle for asset management. These systems must be considered right the way through the delivery of the project, in addition to risk, timesheet management, O & M and asset register considerations.

## Workflow For Approved Model Issue



The four buildings of the MECD project are heavily populated with building services. There are:

- Over 12,000 luminaires
- 120 kilometres of conduit
- 34 kilometres of trunking etc.

Identifying clashes was a task in itself. The fact that the main parties involved started discussions about the project early prevented information loss and ensured that this flowed seamlessly between the design and construction teams.

Balfour Beatty played the role of the fabricator responsible for installing the building services whilst working with the design team. When one of the UK's leading independent engineering and facilities services business got involved in the MECD project, the design information was already there.

The collaboration process was further enhanced by the use of BIM 360. The site team, Balfour Beatty, the consultants involved, and the entire design team have access to information and are able to contribute to it because of BIM360. Models that these different teams work on can be merged in BIM 360 Glue and all accessed through Navisworks BIM 360 at the same time. This collaborative workflow resulted in significant time savings:

15 hours saved a month – Model Federation  
 4 hours saved a month – Federating Comments  
 4 hours saved a month – Clash Reporting

**Total: 276 Hours a year = around 36 days saved**

Risk has been reduced because of the creation of one source of truth that all the teams involved contributed to. There was no need to redesign things which means that the engineering contractor can bring their services into modular construction. *“We’ve got confidence that all the services in the building will actually fit in.”*



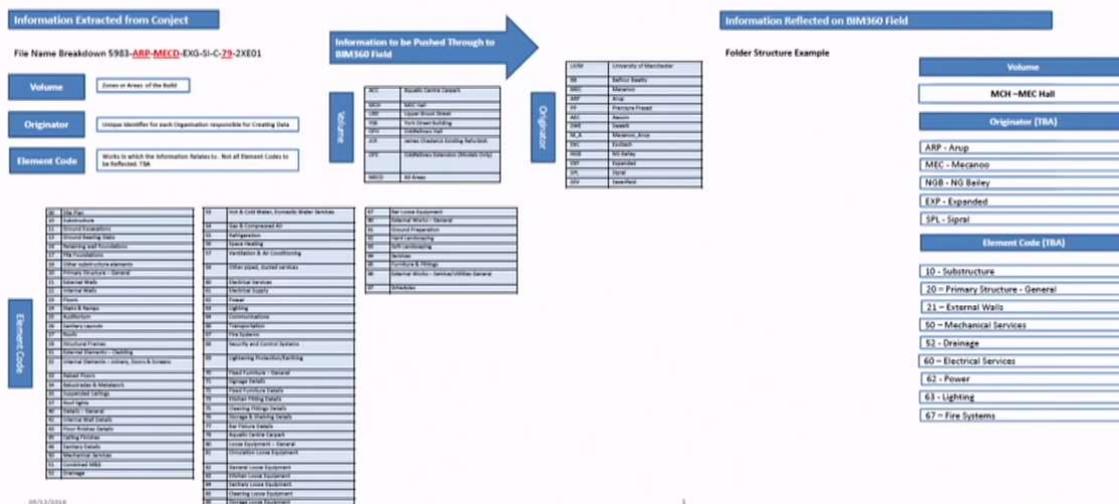
The use of BIM 360 Docs also helped Balfour Beatty with the Reviewable Design Data (RDD) process. This solution was implemented to eliminate the use of FTP sites and other external file sharing options. The Mec Hall alone has 2,000 rooms with different equipment and services going into each. Coordination was key. BIM 360 Docs enabled Balfour Beatty to achieve a quick turnaround as all the information provided by the structural and MEP teams, architects and subcontractors was stored into one central area that all the parties concerned had the right level of access to. The ‘Compare’ and ‘View’ features in BIM 360 Docs proved particularly helpful as it allowed them to check the previous revisions and identify the changes that have taken place in each of the rooms. The solution supported a quick turnaround whilst also ensuring that the data is not accessed by any external parties. The BIM 360 Docs – Revit link was also a useful functionality of the portal.

## Making the latest information available where it matters the most

Approximately 27,000 drawings have been produced for the MECD project. Uploading all these drawings into BIM 360 Field was another challenge.

## BIM 360 Field Library Workflow

## Balfour Beatty



Balfour Beatty created an API and a web interface that pulls on the originator, files it in the originators' folder (inside the BIM 360 Field library) recording the volumes, which area of the building that drawing was related to, the series number and the element codes. This resulted in a well-structured library where all the drawings are listed under their titles and folder structure.

This procedure gave Balfour Beatty confidence that the site team had the right documentation, stored in the right folder structure, and the latest version (also uploaded into Conject, Manchester University's CDE).

## Barcodes for plant equipment

The project involved several large contractors who use the equipment on the field in a slightly different way. Balfour Beatty appended a barcode to each piece of plant as soon as they arrived, associated it with a check sheet on the field, created a list of generic plan references on the equipment and listed them under the different types. As soon as the next piece came in, the person that was signing that piece of plant in would complete the check points. The check sheet, 360° photographs of the piece of

plant, the serial number and then the daily checks against it would all be recorded. As the operator hands the check sheets back to the site manager, they will take a copy of that check sheet for that day.



This procedure allowed Balfour Beatty to mark whether the item has been on-hire, off-hire and the companies assigned to it. *This means that we can tackle exactly where that plant is and none goes missing.* It means that we know whereabouts it's being used and by which subcontractors, how many pieces of plant we have on site. It helps us monitor how long plant is onsite, how long it was anticipated to be onsite, and if it has fulfilled that. It also gives us great data for reporting so we can look at the status and also the duration.

### **Barcodes for staff permits**

Another way that Balfour Beatty uses QR codes is for staff permits. Bar codes are assigned to an item or an asset but in this case they've been assigned to hot work permits. They give staff a high-vis badge, allocate a number of permits to a particular subcontractor, and then assign the relevant check sheets which are linked from their Building Management System BMS (a catalogue of their BMS check sheets is available in the BIM 360 Field system). Anybody that's doing a check, or is out on a tour, can visually see

that a certain person has been assigned a permit and has been accepted work in that area and been checked.



This is an example of someone carrying out some hot works and being checked on. As shown in the picture, the badge is highly visible.

The key point to it is early engagement. We specified in all subcontractor orders that they had to use BIM 360 Field and have a number of iPads to suit their team number. The contractor doing the concrete elements on this project, the columns, the line of walls, the cores and the basement were engaged at an early stage. They had a highly elite QA system that they were already using. After several discussions, Balfour Beatty corroborated both check sheets and ensured that both parties were happy to use the combined check sheet on the field.



All the concrete elements listed above followed the procedure applied to the hot work permits and equipment. A relevant check sheet was appended to those particular types of equipment. Then it went on to the progress mark-ups. Balfour Beatty had a number of reference plans that the contractor used to mark up the pour number, the dates, and then link the equipment to that particular pour. We were then able to link all of that fantastic data, photographs, anything we could append to those check sheets and trace back to establish whether there were ever any issues with any of those concrete items.

The MECD project has proven that digital construction is the way forward. Working with all the parties involved, implementing a system that will benefit everyone is the formula for success. You should start putting processes in place only after engaging with the subcontractors and the supply chain partners and incorporating their feedback. Once this is done, you'll be able to see the benefits of collaborative working and of the workflows implemented.