[CS463357]

Enabling Optimal Workflows Using “AECC” in a BIM Dominated Industry

Lee Barnett
Curtins Consulting Ltd

Edward Heukers
Curtins Consulting Ltd

Learning Objectives

- Expanding your approach into digital transformation
- Widening your interpretation of automated progress on different scales
- Revit customisation in practice
- Aligninging custom applications to industry standards and optimizing Uniformity
- Measuring carbon embodiment through Revit APIs

Description

Uniformity is becoming more important and is still an elusive concept for many. We outline this issue and mention the importance of consistent output. This seminar covers how you can create and adopt efficient workflows for your project(s) and company. Making sure you are up to date with technology and innovation and showing how important active research is for a business. It shows a path that ensures you and/or your company is not a follower but rather a leader, therefore having a positive contribution in improving the industry standards. This seminar is relevant to anyone from Engineer/Technician to Management and all others that are interested. We cover software such as Revit, Advance Steel, and BIM 360 Docs and their interaction in practice. Curtins will allow you to take a peak behind the screens, and will elaborate on our interpretation and approach of BIM, and we will showcase our Dynamic implementation.

Speaker(s)

Lee Barnett

Joining Curtins in 2015, he now oversees Curtin’s digital transformation as our Digital Delivery Manager. Heading up our inhouse team of technology specialists, Curtins have devised tools beyond what is capable from out of the box software and is spearheading improvement in the company and industry.

Lee ensured Curtins to be the first consultant in the UK and Ireland to achieve the coveted BSI BIM Kitemark, aligning Curtins’ process with the latest industry standards, such as ISO 19650 and focussing on automation, uniformity and workflows. Always looking for the next efficiency, big or small.

Edward Heukers

With experience in the Netherlands, New Zealand and Ireland, Edward has grown from technician to project engineer and is heavily involved in the BIM development and deployment within Curtins. Living by the phrase ‘work smart, not hard’ he is always on the search to automate repetitive tasks or tasks with high a high risk of human error. Having extensive experience in DfMA (modular and precast) he has gained valuable insights into the industry and its challenges. He is passionate about project workflows and general efficiencies in its development and application.

Our approach for digital transformation

We are advocates for the improved workflows that come with the adaptation of BIM processes.

- But how do you start on the path of BIM? .
- How to implement change on a large scale? .
- How to successfully roll-out improvements? .

We will share our experience, to help you find the answers to these questions yourself.
But remember, it's not something that happens overnight. It's an ongoing dynamic path that you'll start on.

Curtins has differentiated 3 implementation steps.
These steps are applied parallel to each other over the course of multiple years.
Our belief is that the first steps towards a BIM friendly environment starts within the company. Creating a company that is suited to adapt to industry developments with a healthy mindset is a requirement to innovate and adopt change. Improving on Uniformity, Workflow efficiencies and Quality is the next step to becoming BIM enabled. These improvements can be achieved on multiple levels; from a team, to a company and even the industry. But it starts small, with the individual. The third and last step in our approach is Digital Transformation; ensuring the use of the right tools at the right time, and using them to their full potential.

Step 1 - In-house Improvement

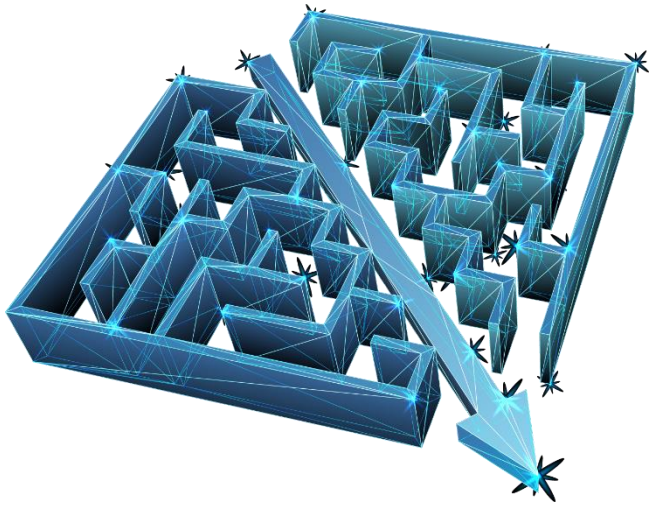
- Company adaptability
- Enabling staff

Step 2 - Growth

- Uniformity
- Standards and templates
- Quality (QMS and output)

Step 3 – Digital Transformation

- Digital delivery
- Software proficiency
- Automation
- Interoperability



Digital Transformation

The next step is to look at keeping up with developments and improving on productivity and coordination. Simply put: it’s about embracing Digital Transformation.

Founding a strong IT department is key and a complimentary team is creating smart automation, to ensure our technical staff is fully enabled. For digital transformation we also look at the interoperability of software, and further process savings.
It is important to use the software available to its full potential, before looking for alternate solutions to bespoke issues. This is where Autodesk comes our way with the AECC package. But the AECC is much like an iceberg, where most of us are only using what we can see on the surface. And its wise to realise now that you may only use 25-50% of the functionalities available.

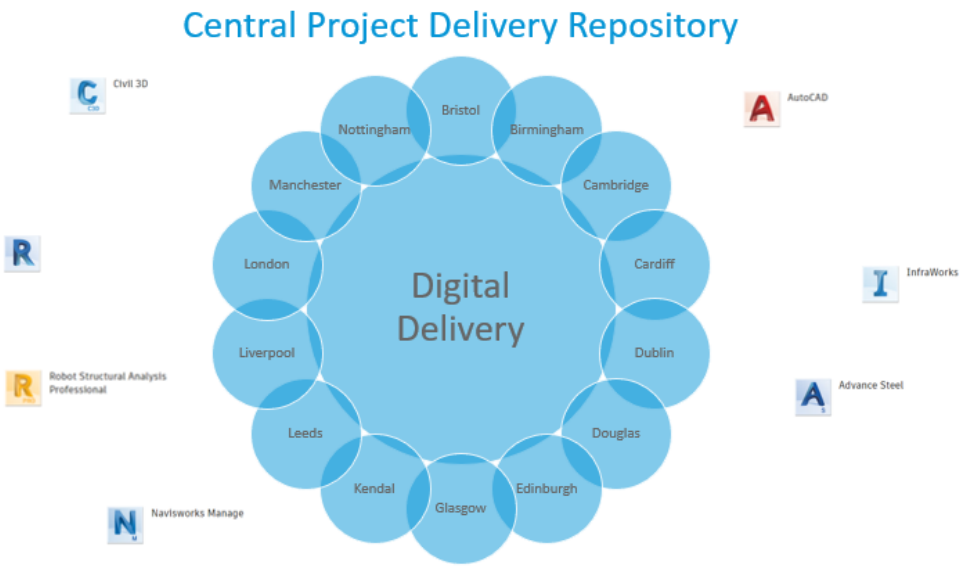
Room for improvement!

Virtual Reality

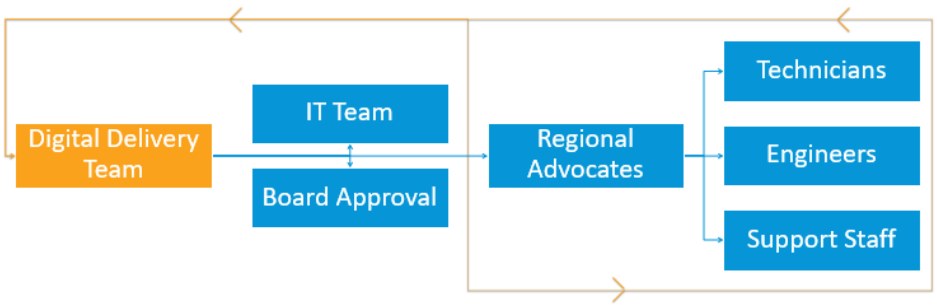
To aid the bid, we also used the Revit add-in Enscape software, which renders and enhances the Revit model to generate visuals and fly throughs.
We've recently held a workshop with a frame contractor who expressed concerns on the feasibility of some complex reinforcement detailing. Using the Enscape software and VR headset, we were able to demonstrate how we would be detailing the reinforcement.
You are also able to create .exe files from the Enscape model which enables people to review the models without needing an Enscape licence.

Central Project Delivery Repository – Digital Delivery

Providing our end users with a strong IT infrastructure and hardware across the organisation, we set about creating a centralised, resource across all locations. We avoided using the term BIM as we found there was a great deal of uncertainty, preferring the term Digital Delivery.
Five years on, Digital Delivery has long established templates and content for all our common software within the AECC portfolio.



Process for Digital Introductions



Digital Delivery is a powerful tool, when it focusses on coordination and information management. But, to make all this work, you need a clear roll-out strategy. A linear team set-up is paramount to successful deployment of change. The simple team chart outlines the basics of our digital development. 'less is more' . It motivates staff to feel involved, to know where change comes from, and to have the platform to voice their own ideas.

Digital Delivery Advantage

Staying competitive is now more relevant than ever, with the world economies taking some big hits in 2020.
We have dumbed down our competitive standing to 3 simple questions:

- Are we winning new work?
- Do we stick out from our competitors?
- Are we profitable?

The answer to these questions are ever-changing and it is your goal to keep them at yes. Where it is important to understand that the BIM stages are dynamic.
Our Digital Delivery solution affects the answer to all of these.

- You'd open yourselves up to BIM (stage 2) projects. Increasing potential work opportunities.
- You may set yourself apart from others who are less BIM enabled.
- Potential higher quality and better documented output will benefit your case.
- And a shorter design programme may result in economical advantages.

Today we urge you to take that extra leap further into your interpretation of BIM!

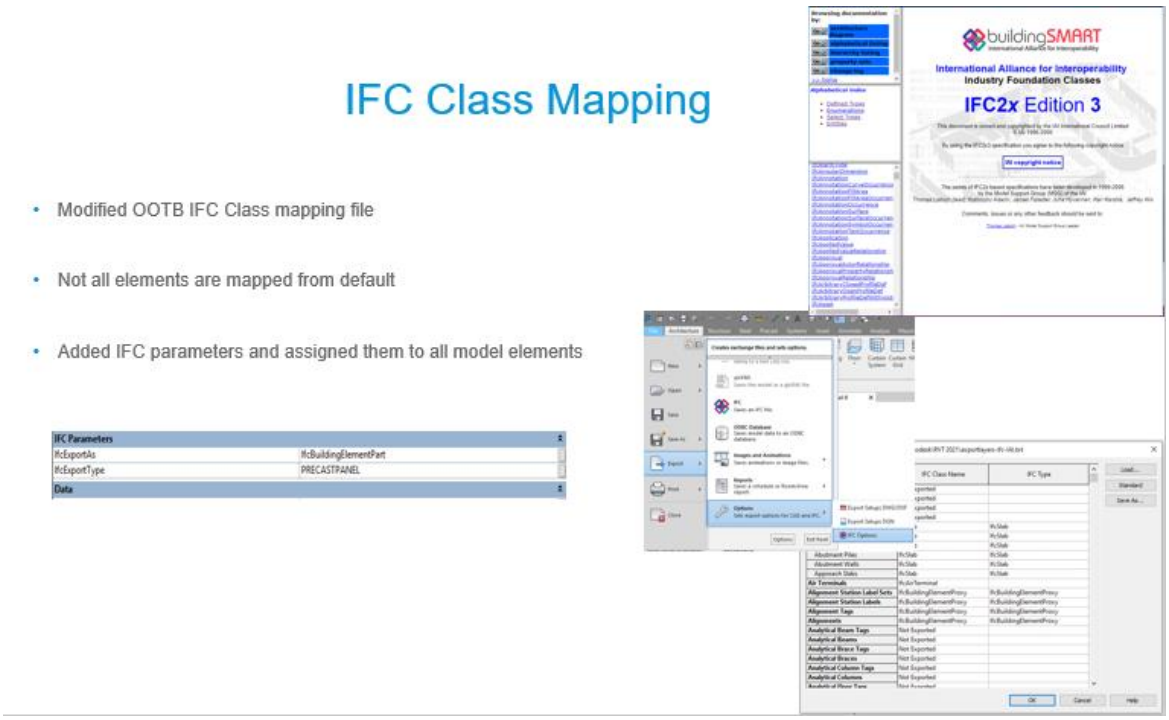
To stop being a follower of the industry trends, and start leading!

Revit Customisation

Revit is Curtins primary BIM authoring tool. It is used on a daily basis by over 90 structural technicians across our organisation . As our primary tool, it is also one which we have heavily customised.
When initially setting up a centralised template we wanted to ensure that it was easy to use and could be used by myriad of ages and skill sets. We set about setting up common view types, schedules to ensure uniformity and improve production. We abandoned the OOTB families, developing our own. This ensured they had consistent parameters, correct geometry and orientation. All our model elements within our library are named to the industry standard BS 841 for consistency. All library components contain the relevant industry standard Uniclassifcation codes and manufactures data sheets. Setting up this structured baseline allowed us to progress to more advancements

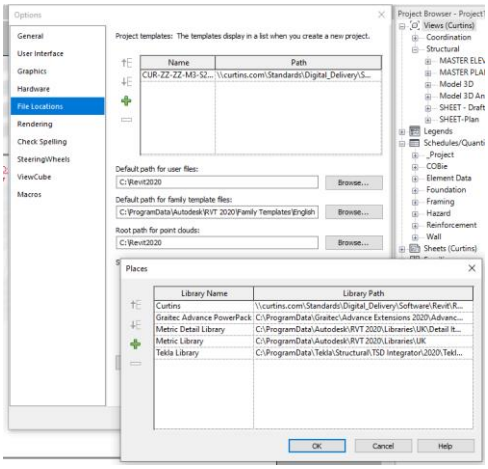
IFC Class Mapping

We Modified OOTB IFC Class mapping file as not all elements are mapped from default by Autodesk. We added IFC Export As and ExportType parameters and assigned them to all model elements. This way we ensure all elements from our bespoke library elements produced “the perfect IFC”



Revit “Ini File”

The Revit ini file is a text file which Revit rights back to The **Revit.ini** file is used to store settings such as, template file location and recent files. Many of the settings can be set within Revit and are saved here when a change is made. When creating a Revit **deployment**, you can select a custom Revit.ini file. This lets you set the default paths for templates, content so everyone in the firm starts with the same settings. So this is how we ensure uniformity across the business



Vanilla Revit Limitations

Although Revit is a great platform our technicians, there are some constraints that we used to accept in the Vanilla version.
Any of these common limitations, can easily become a headache for any technician.
Some of the common barriers are:

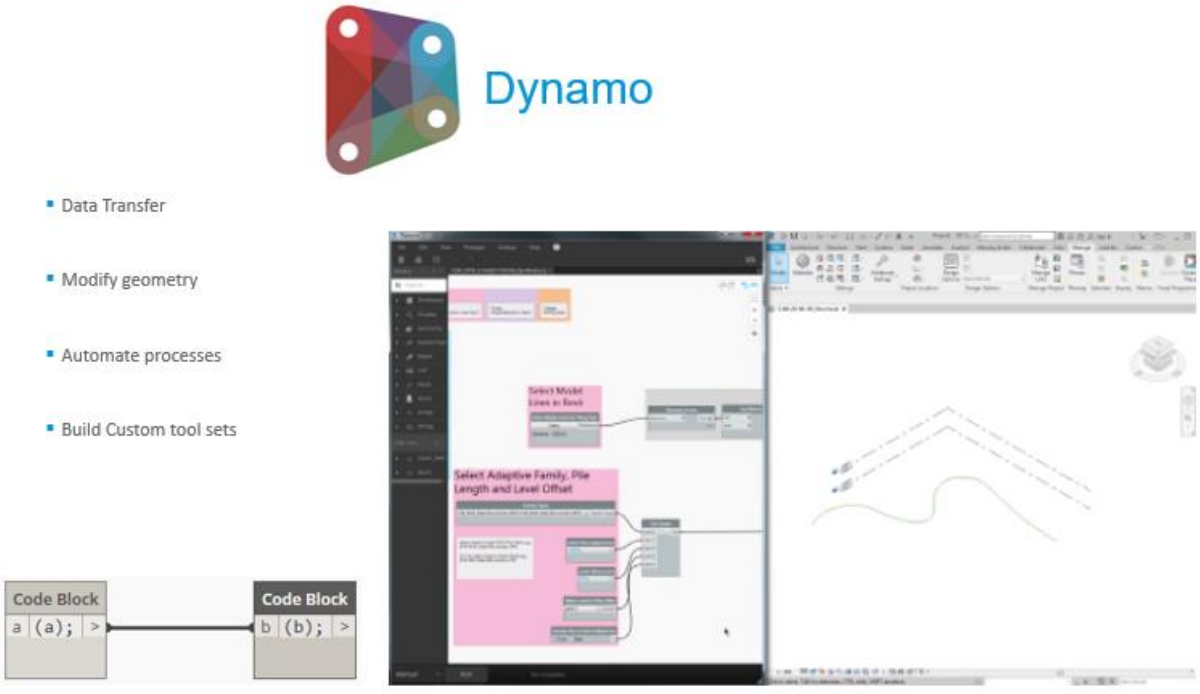
- Communication between revit and other software outside the AECC package
- Out Of The Box Revit is not focused on automation, and often results in repetitive actions
- Various tools may not be suitable for complex or bespoke output

But Dynamo may offer a solution to these problems.

Dynamo

Dynamo is a graphical programming application for Revit, within the AECC bundle. Simply put, it is a tool to help you to get from A – B quicker. It lets you create new tools to unlock the full potential of 3D modelling. Dynamo expanded our mindset of what could be done, and increased our ability to automate. As a result we are no longer bound by what vanilla software limits us to do.

A multitude of these scripts result in significant time savings across the business and increases productivity.



Revit API (Application Programme Interface)

The Autodesk Revit API allows programmers to change elements in the Building Information Model (BIM) directly or to access the data to perform specialized tasks.
Revit API allows you to create their own custom tools through coding

- Create structured automation
- Improve efficiency
- Overcome software limitations

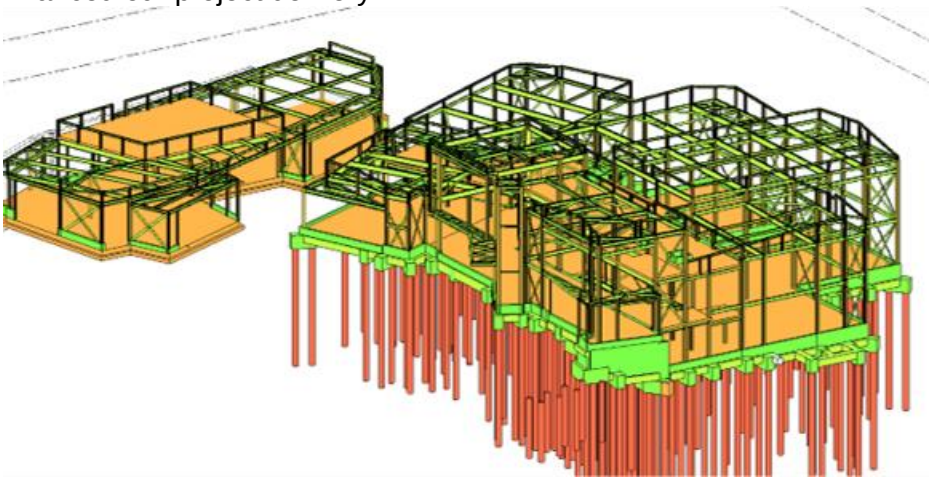
Our first step into hard coding was through the Autodesk Macro Manager, like Excel it allows you to run macros within your project.

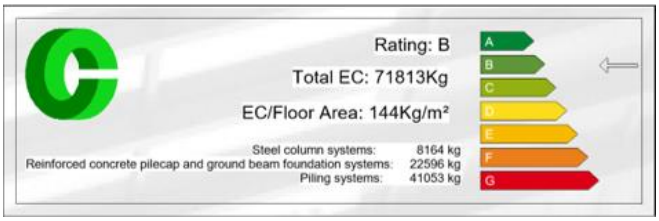
Please see our presentation video for further information and videos.

Carbon Footprint – Mission Statement

We all know climate change is a reality. As an organization we can build awareness across the industry. We wanted to measure and record carbon as a metric on all projects. We also wanted to include this information on drawings and models. With our extensive Digital Delivery library with embedded data, we felt confident in our ability we could easily develop a simple and easy to use application for Revit.

So welcome to the premiere of our Carbon tool. Launched across our business prior to the UK lockdown it has now been used on numerous projects. The only manual input required is of the total floor area of the complete structure, the rest is automated beyond this point. The tools then automatically calculates the elements embodied carbon using the embedded elements. A heat map is provided to isolate concentrated areas. We have then created a Carbon rating which is applied to the models “Splash screen”. These innovations and structured information have enhanced our project delivery

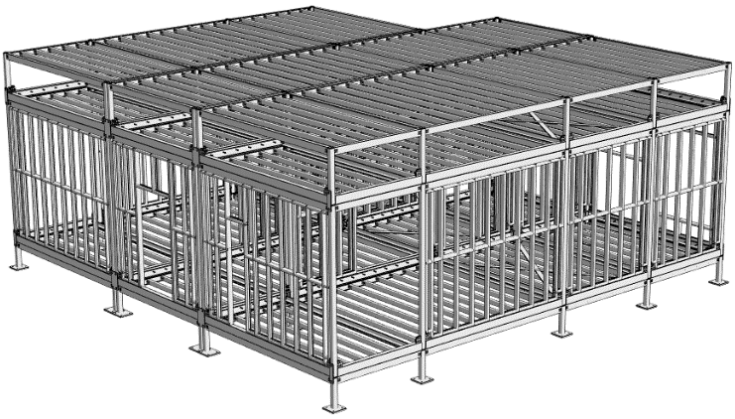




Project Examples

In the past we've had a modular job which required deliverables that were new to us.
We had to look into the delivery options to ensure a productive workflow, as we were aiming to create this new service. We first looked to the tools we already knew, and realised that it wasn't optimal to deliver the fabrication level of detail that's involved in most modular projects.
Software output that can directly communicate with supplier machinery is a massive hurdle to overcome, and this has to be a fool-proof workflow. Without much effort we soon found an economic path within the AECC, that allowed us to engage in volumetric design, without having to invest in bespoke and costly alternatives. The interoperability between Revit, Advance Steel and Robot, with Dynamo support was an eye opener.

We had learned long ago that coordination and full design team involvement is essential for off-site manufactured buildings, and we stress the importance of having personal workshops with different disciplines from the get-go. When everybody is on the same page, and the design is halfway finished, our technicians can really shine. Going from IFC format into Revit. From Revit into Advance Steel and back again, while utilising the best parts of both fully enabled programmes.

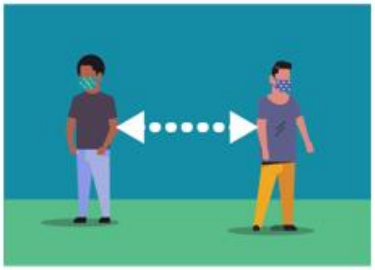


This process allows for a whole new level of detail and provides automated shop-drawing production, saving numerous hours of hard work. With multiple add-ins fully supporting the integration of multiple softwares, we managed to expand our Digital Delivery options.

Beyond the AECC

But there's more than 'just' the AECC. And Autodesk caters to our needs.

Digital collaboration is becoming more and more of a requirement, and Autodesk is here to help. Common Data Environments, BIM model federation, Clash detection and review processes is what's coming our way.



Social Distancing

Working From Home

Digital Collaboration

BIM360

Social distancing has resulted in remote working for many. But allowing your company to thrive from people's bedrooms and living rooms may need some extra help.

BIM360, and its default Docs can ensure coordination and documentation of your projects to the highest standards. No matter where you are. No more expensive servers for your company, as you use the cloud. An internet connection is all you need, although you can even get access when you're offline. It is quite exciting what Autodesk enables us to do with this platform.

This is a platform that can be efficient for both internal and external use. and it's potential is unchecked when the construction industry adopts BIM360 to be the standard.

Generative Design

On top of what's already out there in bulk, as an organization we are excited by the new concept within Revit of Generative design and machine learning. We have seen examples from Autodesk for massing studies, room layouts and crane positions. But what else is it capable of?

Our Digital Delivery team are now actively looking into using it for RC Detailing Design, Column Layouts, Geometry of buildings, Modular Design, Carbon reduction studies.

- Massing studies
- Room layouts
- Crane position
- What else?