



**Construction Industry Federation
Submission to the
Government Construction Contracts
Committee
On**

**A Public Sector BIM Adoption Strategy
April 2017**

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1. Introduction

In March 2017, the Government Construction Contracts Committee published their position paper ‘A Public Sector BIM Adoption Strategy’, as part of the consultation process on the adoption of BIM in the public capital programme.

In response to this call for submissions from interested parties, CIF conducted its own survey of our members to obtain views from all regions and disciplines. The CIF is structured so as to reflect the sectoral and regional dimensions of Ireland’s construction sector, with 13 regional branches and sectoral groups representing housebuilding, main contracting, civil engineering, mechanical & electrical and specialist contracting members.

As part of the internal CIF consultation process, input was also sought from the CIF Lean Construction, Building Information Modelling (BIM), Innovation and Continuous Improvement Committee. This committee was formed in 2016 with the objective of considering all policy developments/matters in the area of Lean Construction, BIM, innovation and continuous improvement and to oversee and guide the Federation’s relations with relevant national and local bodies including Government departments and state agencies. As such, the feedback from members of this committee was instrumental in compiling the CIF response submission.

The primary objective of BIM should be to maximise the efficient use of project team resources to deliver best value first time. BIM should be used where it can be shown to add value, and with sufficient lead-in time to deliver on those expectations. It is critical that process, understanding, responsibilities and participants are aligned under a clear common framework to permit this. There needs to be a clear definition of what the BIM levels are, particularly on what is meant by BIM Level 2. The GCCC should also set a definitive statement and targets for what should be achieved by introducing BIM to public procurement.

In time, the key challenges should include scope on how to allow consultancies and contractors further progress BIM, within this strategy, from 3D to 6D (4D – linked to programme, 5D – linked to cost, 6D – linked to asset management information). The strategy includes detail on the BIM model to be produced for the tender stage. Thought should be given to the integration (basis of how to model is produced) of the BIM model with 4D & 5D software (such as Synchro & CostX). This is where the major benefits of BIM will be achieved.

This submission should be read in conjunction with Appendix A: mandatory response to questions posed in GCCC position paper.

2. Key Issues

In developing this submission, CIF identified a number of key issues concerning the public sector adoption strategy for BIM:

- 1 The plan should establish clear objectives, principles and deliver an understanding for participants.
- 2 The need for national standards and protocols.
- 3 Education and training framework recognising the different roles and entities involved with support for indigenously focused companies.
- 4 Establishing evidence based costs of BIM implementation and providing for transitional project allowances to accommodate investment.
- 5 Dealing with procurement and the contract change management process to facilitate BIM and maximise market participation, particularly amongst SMEs and the wider supply chain

3. National Standards and Protocols

With the ongoing development of ISO/CEN Standards for BIM adoption throughout Europe, it will not be sufficient for NSAI to incorporate EU standards into Irish Statute Books and for the construction sector to interoperate accordingly. A national authority should be established to disperse the appropriate technical information to both the public and private sectors. This could then lead to national BIM accredited certification approved by statutory bodies. This authority could have a role in supporting implementation and monitoring compliance.

Stakeholder bodies need to embrace the digital revolution and enhance the collaborative process that BIM offers thus improving better co-ordination and construction information. A BIM forum should be established to engage organisations in their adoption and BIM implementation by setting minimum standards required.

Legacy software and organisational protocols are slowing the transition to the adoption of 3D information (BIM Level 2). The advancement of digital technologies has been prolific over the previous 5 years with great advancements in hardware, software, common data environments, total robotic stations and field applications. Now is the time to embrace the digital revolution, that has transformed other sectors, such as manufacturing, and apply best practice to the construction industry.

There is a significant gap in the initial design co-ordination of major packages such as M&E, which causes extensive waste, delay and rework. Prefabrication and procurement management are identified as the most recommended methods for minimising waste. Prefabrication of building components at a remote facility can be shown to save space for material storage on site, assures better quality control of part production, reduces waste and enables reengineered and more efficient supply chain management. It is important that companies have an internal BIM capacity, that they don't just outsource delivery of their information.

There needs to be a co-ordinated approach between Ireland's standards development and the EU BIM Task Group.

We must establish a clear public sector EIR and AIR, and this must be universal across the public sector. This will ensure consistency across the sector and provide best possible VFM.

The project team should be required to prepare a model in an Industry Foundation Classes (IFC) data model. This addresses data ownership but also software interoperability and the accessibility of file formats. We should ensure the following deliverables are issued: native file format of all files; federated models; as constructed PDFs; and COBie.

It is important that the delivery and management of data respects the contractual framework and that risk is allocated accordingly. The Model Production and Delivery Table (MPDT) must be populated in advance of the construction team's involvement or there could be significant intermittent delays in progress.

4. Consideration for Smaller Projects and SMEs

It is important that we recognise high-level management issues and separately try to establish the solutions to the challenges for the trades and suppliers manufacturing, installing and commissioning works. Implementation of a set policy as proposed by the GCCC has the potential to discriminate against smaller companies, who cannot afford the time and funds to invest, allowing the larger companies who have such resources to win all the projects, and ultimately lead to an uncompetitive market and industry. This runs contrary to the objectives of Circular 10/14: Initiatives to assist SMEs in Public Procurement.

Due to the fragmented nature of the industry, and the propensity to multi-layer sub-contracts, ultimately there are a number of very small contractors or sole traders on the ground doing the work, with layers above them. It is difficult to see how BIM will cascade down to the tradesman on the ground, as their only piece of technology is usually a smart phone. This would suggest that somewhere further up the supply chain, the BIM requirements are concluded and terminated, potentially with the main contractor or their Tier 1 sub-contractors. Facilitating these mid-tier sub-contractors will be the key and where maximum support, flexibility and training will be required.

SME companies traditionally operate on smaller margins which will leave little room for investment in new technologies. Evidence from private sector adoption shows that success has been driven by client commitment and investment.

We need to get to a position where it is feasible for sub-contractors and suppliers to provide their workshop drawings in 3D platform.

BIM introduces a requirement for dedicated IT management to deal with the flow of data. There is a tipping point for SMEs as to whether or not they can invest in a dedicated resource. Until such time as the process becomes part of an existing role's responsibility, there will be limited adoption.

The paper suggests a dedicated 'Project Information Manager' to each project. This may not be practical for smaller projects. The project size needs to be able to justify the overhead assigned, and it is likely that a single PIM may be assigned across multiple projects.

It can be hard to justify BIM on smaller projects, particularly if BIM is driven by commercial ROI considerations. There is a significant amount of overhead required to develop and implement the strategy and smaller projects are unlikely to be able to sustain this initially. Such projects rarely benefit from economies of scale, so care should be taken when 'requiring' BIM on different sized projects. The GCCC should set a benchmark for minimum project value, below which BIM would not be required. As the industry meets the new standards and changes its methods to be BIM ready, then smaller projects should start to gradually get the benefit.

5. Cost Implications

CIF believe that a dedicated cost item should be clearly identified in the Bill of Quantities, for meeting BIM project requirements. The typical costs associated with BIM implementation as evidenced by CIF members are outlined in the below table.

Assessment of Training Needs & Labour Costs		
	SMALL/MEDIUM COMPANIES	LARGE COMPANIES
Training & Educational Programmes Requirements	BSc/PGd MSc BIMM; BSc/PGd/MSc Architecture Technology; BSc/PGd/MSc Construction Informatics; BSc/PGd/MSc Construction Management; BSc/PGd/MSc Civil Engineering; Higher Certificate in Construction Technology; PG Cert and PG Dip in BIM Management & Technologies; MSc in Applied Building Information Modelling & Management (M&E); Mechanical Engineering; Building Services Engineering; PG Dip in Collaborative BIM	
Programme Costs	Diploma/certificate courses €400-€900 per module; Degrees/MScIS €2,500-€7,000 per annum per candidate	
Staff Training - Time Dedicated	5-15 hours per person per month	15 hours per person per month
Non-Productive Labour Cost - Hours Lost	16 hours per person per month	16 hours per person per month; 20-25 hours per person per month for building services contractors

NOTE: MICRO COMPANIES DID NOT ENGAGE IN THIS SURVEY WHICH REAFFIRMS CONCERNS ABOUT THE DIFFICULTY OF BRINGIN THIS LEVEL OF CONTRACTOR THROUGH SUCH A TRANSITION.

To fully utilise BIM on a civil engineering project, there may be major investment in plant technology to facilitate data capture. For example, all the plant and equipment on site would need to be set up with GPS. There is likely to be limited availability of excavators in Ireland that are set up so that a 3D surface model can be uploaded remotely to their on-board server and GPS system. This is what is required for a contractor to get the real benefit from BIM on a civil engineering project and could lead to limited competition in the short to medium term as companies scale up for such an investment.

There is strong concern about the ability to access existing buildings for 3D scans within any reasonable timeframe to allow for model development. This could have major cost implications for contractors, lead to delays and also projects being forced to commence with incomplete data.

6. Education and Training

BIM implementation cannot be properly adopted within state bodies or organisations without the people who have the knowledge and expertise in the prescribed BIM standards and protocols. There are numerous companies offering CPD BIM Courses from software training to BIM protocols with course content variable in quality and presentation. Therefore, a national curriculum in BIM, covering all aspects of BIM from defining the levels of maturity, protocols, collaboration and technologies, should be established and taught in colleges and apprenticeships throughout the country, to ensure regionally consistent competency.

We need to ensure a clear and very well communicated message is being delivered across the public sector. This must start with a BIM education and awareness programme for the public sector, starting with the end user and beginning with the end in mind.

The way we currently deliver design in Ireland will need to change. Clients would need to get used to receiving 3D models for review instead of drawings until design development is at least 70-80% complete, otherwise progress will be adversely affected.

It is key that together with a prescribed education and training framework, initial subsidy supports, particularly for SMEs, need to be available. There must be a recognition that the domestically focused industry is central to economic output and requires specific assistance to train, upskill and upgrade both software and hardware infrastructure.

7. Procurement Model

BIM Level 2 is appropriate for fully designed traditional procurement, where the client is committed to and invests in the design team costs, and adequate time, for preparing the model. It should be borne in mind that existing standards (PAS1192 and ISO19650) reference application in industries where Design and Build are much more prevalent.

There are potentially significant time savings at the tender stage in evaluating contractors' offers where a BIM model is used as a tender document. We must ensure there is a clearly defined process of assessing ITT information before it is issued for tender and ensure it meets the BIM requirements.

The position from Government should be specific in terms of what is specified as the responsibilities of all parties involved in the project lifecycle. CIF would recommend that standard specification appendices are prepared for inclusion in contracts for consultants for the design process and contractors for construction. These standard specifications should be reviewed by each area of the public sector and clauses engaged depending on the sector / project requirement. The selection of clauses should be accompanied by a cost benefit analysis to avoid unnecessary costs and ensure alignment with the contracting authorities' long term facility management strategy.

Key to the successful implementation of BIM in the project lifecycle is the use of a concise contract that has been prepared with the use of BIM embedded from project inception and taking cognisance of the sector and Government strategy.

It is notable that the suggested adoption timeline is to implement BIM on the most complex projects first. This is probably the right approach, clear definitions of expectations of all groups and clarity of process flows must be created and pilot tested before risk is transferred into binding contracts.

One of the benefits of BIM is the data enriched models produced during the evolution of the project from design development through to construction and handover. During the design and construction stages the level of information is developed and enhanced at each different stage. The asset information requirements should be clearly defined by the client from the outset. Therefore, as part of 'A Public Sector BIM Adoption Strategy', templates should be formatted for each type of project (hospitals, schools etc.) so that as each discipline's BIM model progresses, the data required at the design and construction stages are clearly defined and populated by relevant design or construction team member as per the prescribed asset data templates. By defining the data requirements at the outset of the project, when the construction stage is completed, transferring the accumulated data information within the BIM models should ensure the easy integration into the FM facilities platform and the electronic safety file.