NBS

# National BIM Report

## for Manufacturers 2017

RIBA Insight

We would like to thank the CPA for supporting this report.





# Introduction

**Richard Waterhouse**
CEO, NBS

This report provides the findings of the first NBS survey into BIM and construction product manufacturers. We are grateful for the support of the Construction Products Association in carrying out this research.

In the coming years we will see profound change in how buildings are designed, built and maintained. This change will directly affect how people live and work together.

BIM is the first step in this and for the last seven years, NBS has been charting the rise of BIM in the UK design community. In this time, BIM has grown from a few pioneering architectural practices, to become the design environment of choice. The UK is now a global leader in BIM.

The catalyst for this has been the Government's BIM mandate, through which there is now a requirement to provide collaborative 3D BIM on centrally-procured projects. Through this mandate, the Government has demonstrated the benefits of BIM; not least the return on investment it delivers.

The challenge of the BIM mandate has been met by practices, professionals, institutes, information providers and standards bodies coming together to form a vibrant, collaborative BIM community. This community is ready to support those adopting BIM with freely available advice, guides, standards and tools.

The findings in the report demonstrate that BIM is the future, for both designers and construction product manufacturers. Three quarters of manufacturers agree that BIM is the future of product information.

It's not just designers who can benefit from BIM. Since people have been creating buildings, innovations in construction products have radically altered the built environment. Roman concrete is an old example of how new construction products change people's environment, and their civilisations.

However, innovation is now as often found in information as in the creation of new materials. The design community is onto this. New design possibilities are being realised through BIM and digital design. The value of a building no longer resides solely in the products and systems it is made of, but increasingly in the information held about it. Our ability to collect, aggregate and analyse data is growing at an unprecedented rate. The built environment is not exempt from this.

This has created opportunities for construction product manufacturers.

In the short term, the design community is increasingly requiring well-structured BIM objects to incorporate into their designs. Failure to provide BIM objects may result in products being excluded from the design.

In the longer term, as we move towards BIM Level 3, information contained within a BIM will be fundamental to the analysis and improvement of a design, once in use. This will allow for detailed assessment of product performance in situ, a ready route for product development and refinement. BIM offers a route to close the loop, from product design to real-world in-use assessment.

Well-structured information, both within and linked to the objects, is key to unlocking these opportunities. Initiatives such as the NBS BIM Object Standard and the NBS National BIM Library have provided construction professionals with the tools required to produce standardised, coordinated, information sets on projects.

At NBS we are proud of the key role we have played, and continue to play, on national BSI committees and also European CEN committees. Standardised information, combined with practical examples of how to implement BIM on projects, is what the industry needs to turn BIM into 'business as usual'.

Collaboration is at the heart of BIM. Through the standardised information in BIM, manufacturers and designers will be able to work increasingly closely together, making sure the right product is selected, installed and used through the life of a project. The data in BIM provides a ready reference for the criteria for product choice. Increasingly, it will come to provide the information for product and design development.

The findings in the report demonstrate that BIM is the future, for both designers and construction product manufacturers.

# Manufacturer BIM objects facilitate dynamic digital design

**David Miller**
Director and Principal Architect, David Miller Architects

**At David Miller Architects (DMA) we place a strong focus on digital design and construction methodology and have for the past 12 years incorporated 3D geometry into our project modelling. As such, we seek out high-quality BIM objects for use in our project designs.**

We started out as a micro-architecture practice (a team of four) in the mid-2000s and it soon became clear to us that if we adopted a risk-averse approach, especially on publicly funded projects, we could miss out on the very type of projects that excited us. We quickly realised that to be able to grow and have the opportunity to work on larger and more interesting projects, we needed to find a way to differentiate ourselves.

We believed that BIM provided the opportunity to break the mould of traditional design and construction processes, and by adopting and investing in a digital strategy, we are now a team of twenty forward-thinking architecture and design professionals, working on the types of projects that we had set our sights on. We specialise in living, learning and placemaking and use BIM tools on all our projects at every stage from inception to completion.

Although we're clearly BIM-advocates, we recognise this isn't the case for everyone. Even with the UK Government's April 2016 BIM Level 2 mandate, there is still a need for a large percentage of construction product manufacturers to recognise the benefits of digitising their products and providing dynamic information.

David Miller Architects



NBS

**Left, and far left**
*Salter Street - a six-storey building, providing 17 new homes. We worked closely with the client to set up the first range of BIM objects which were then used again on the second project at Boleyn Road in Hackney.*

## BIM objects in operation

BIM has created an environment where manufacturers have the opportunity to present their products to designers and specifiers in such a way that makes them stand out from their competitors, containing the accurate and structured information needed on the geometry and technical data of the product(s).

There has never been a better time to embrace advanced technologies, having the vision to understand digital construction and in particular BIM, and taking advantage of the technologies that are shaping the global built environment can only be to the suppliers' advantage.

We are fortunate, however, that many progressive product manufacturers have adopted BIM and are now adhering to Level 2 requirements, providing all their products' data in intelligent formats that we can compare and analyse in project workflows and models.

When we first started working with one of our residential developer clients, Columbia, we quickly realised that there was an advantage in creating a suite of products that we could use on multiple projects. Having agreed the needs and requirements of the client, we set about selecting manufacturers' products via the NBS National BIM Library which could offer the suitable properties and which met the required standards.

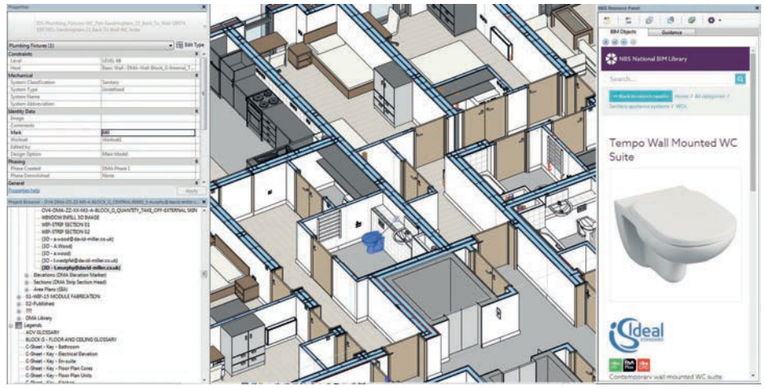
Our first project for Columbia was Salter Street which was completed in August 2013. It is a six-storey building immediately adjacent to the Docklands Light Railway viaduct and Westferry Station, providing 17 new homes with a variety of types including larger family units and a mix of tenures to create a sustainable development.

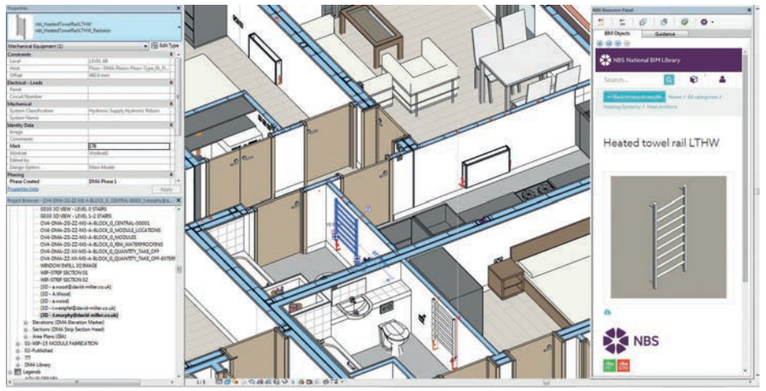
On this project, we worked closely with the client to set-up the first range of BIM objects which were used again on the second project - Boleyn Road in Hackney.

In May 2015, we completed the third development on Finchley Road, Hampstead. This high-end residential development provided 22 new homes and by utilising the growing library of BIM objects that we had created on the previous developments, we were able to complete our information at a faster rate, with assurances that the products were of the standard and quality needed in the build. We carried on using this same suite of products on a further five projects.

Having this standard format to use for product/object selection meant we could bring significant efficiencies to our project planning and help our developer client achieve their financial goals where speed to market is critical.

**Right**
*Examples of the effective use of BIM objects which has sped up our design process, provided excellent quality control and offers the client a fully interactive as-built model.*




## Benefits of intelligent objects

Having used high-quality BIM objects on the first project at Salter Street, we had developed a strong baseline where we could evolve and refine our suite of objects which we have grown to trust. By pulling them through to our latest and largest development for Columbia yet - Gateway House, Finchley, a £15m mixed use scheme with 77 homes, commercial space and a new public library - this has given us full technical optimisation.

This effective and consistent use of objects has sped up our design process and provided excellent quality control. Not only can we achieve substantial savings regarding costs, but we can offer the client a fully interactive as-built model.

Having product information in BIM object formats means it is consistently formatted, accurate and correct, providing invaluable reassurances that the information, geometry and behaviour of the product is perfectly suited to the client's project needs.

In an ideal world, the traditional construction industry where we worked with vague and inconsistent product information will soon be a distant memory, and as designers and specifiers we will have greater opportunities to collaborate with those manufacturers who understand the benefits that BIM presents.

# Manufacturers' BIM survey: summary of findings

**Adrian Malleson**
Head of Research, Analysis and Forecasting, NBS

**Welcome to our first report on BIM usage and adoption among construction product manufacturers**

For the last seven years, we have been running an annual survey on BIM among the UK design community. During that time, we have seen BIM change from a niche practice used by a handful of innovative design practices, to it becoming the norm for collaborative design.

Last year we also saw the introduction of the UK BIM mandate, putting the UK in a leading global position on BIM, and spurring BIM adoption for those wishing to work on central government-funded projects.

In the UK, a majority of practices now use BIM (at some level). Almost all design practices that are not currently using BIM expect to do so within the next three to five years.

At the heart of BIM is the well-structured, standardised information that allows collaboration. This information might be geometric, describing the dimensions of a product and its place in a design, or it might be other kinds of information, such as performance or classification information.

The requirement for this well-structured information places demands upon construction product manufacturers. Increasingly product manufacturers are being asked to provide product information in a range of formats, for different people and at different points in the construction timeline. This is not an easy task. A manufacturer may need to produce product brochures, product data sheets, compliance declarations, certifications, specifications and BIM information.

This report looks at BIM for the manufacturer, and goes some way towards answering the question "Is it worth producing all this information?"

When carrying out the research with manufacturers, we put the same or similar questions to them as we previously did to specifiers, where this was possible. This allows us to compare the views of manufacturers with those of designers, where it makes sense to do so.

As ever, our sincere thanks to those who took part in the research. We had 173 respondents, and we hope this will be a foundation for the coming years. By taking part, you have helped ensure that we have a reliable resource with which to assess BIM in the UK.

Increasingly product manufacturers are being asked to provide product information in a range of formats, for different people and at different points in the construction timeline.



## BIM usage and awareness

*"I have seen a vast increase in the requests for BIM objects not only on Government projects and not only for the larger consultants."*

| | |
|---|---|
| Aware and using BIM | 68% |
| Aware and not using BIM | 30% |
| Not aware of BIM | 2% |

### Current use

Among our respondents, we can see that a majority have adopted BIM and that BIM awareness is near universal. It is worth noting that the question here is self-reporting. We did not provide a set of criteria for BIM adoption; instead we simply asked. Nevertheless, at the very least this means that the majority of UK construction product manufacturers are taking steps to provide product information in a format that can be placed into the designer's own model.

This level of adoption is similar to that among designers, where 62% have adopted BIM. This makes sense. For most manufacturers, creating and providing BIM information is a response to demand from the specifier and the design community. Providing BIM information can be a way into BIM-based projects.

*"There is a clear increase in demand for BIM content".*

Those designing with BIM are looking for manufacturers to provide BIM information. Seventy one percent of designers using BIM told us "we need manufacturers to provide us with BIM objects".

For most manufacturers, creating and providing BIM information is a response to demand from the specifier and the design community.

We found that the intention among the design community is for near universal BIM adoption, and soon.

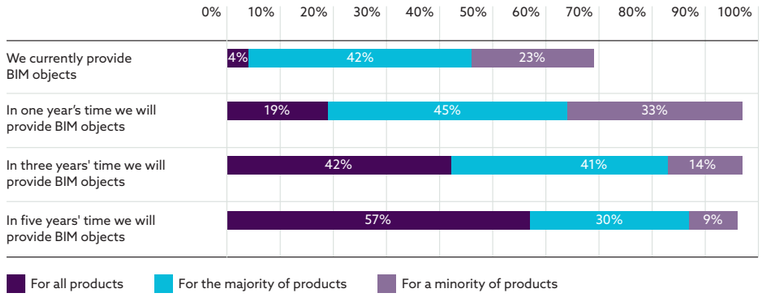
## Future use

*"The industry has made a step change - although not necessarily across the board. We should congratulate ourselves and continue to move forwards rather than beat ourselves up and stagnate."*

Designers are making clear statements about future BIM use. We found that the intention among the design community is for near universal BIM adoption, and soon. Within three years, almost all (95%) of practices suggest they will be using BIM. Whilst we might make some allowance for those intending to adopt BIM failing to do so (for whatever reason), the direction of travel is clear. Product manufacturers are travelling this way too. It looks likely that in three years' time nearly all manufacturers will be able to offer at least some BIM-ready information for their product range.

In the coming years, more manufacturers will be making BIM information available and more products will have BIM objects. The graph below suggests that within five years a majority (57%) of manufacturers will provide BIM objects for **all** of their product ranges. Fewer than 5% will have no BIM objects. As we have seen with designers, the direction of travel is clear. BIM will become the standard way to exchange design information, including product information.

### Future use

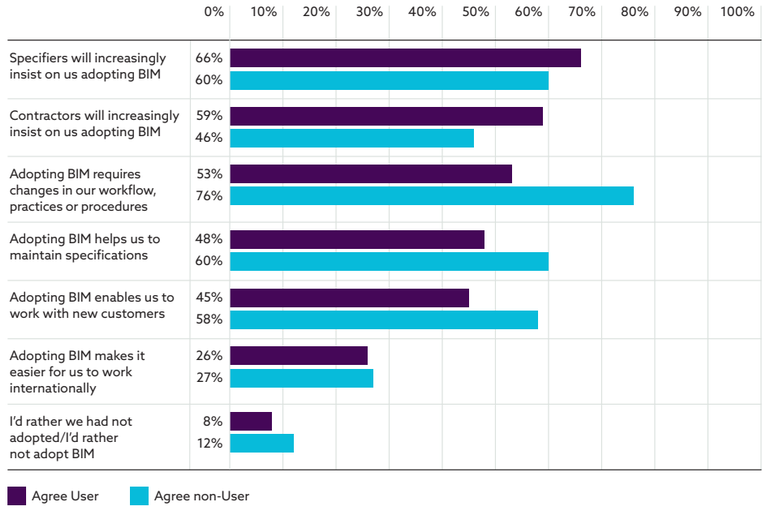



BIM will become the standard way to exchange design information, including product information.



NBS

### Attitudes to BIM




This projection of future engagement with BIM by manufacturers fits with current experience. The graph above shows agreement with statements about BIM, split by those who describe themselves as having currently adopted BIM, and those who do not. For both there is a clear majority who see that BIM requires changes to working practice, but that BIM information will increasingly be required by specifiers. A majority of BIM adopters expect that contractors will increasingly insist on BIM, although the figure is lower among those who have yet to adopt BIM. BIM is not seen as a ready route to working internationally (although perhaps as international BIM standards become increasingly harmonised, this may change).

It is worth noting that among manufacturers who have adopted BIM, only 8% told us that they would "rather we had not adopted BIM". So it looks like the effort required is seen as well spent.

A majority of BIM adopters see that contractors will increasingly insist on BIM.

## BIM knowledge

*"Still as big an enigma as ever."*

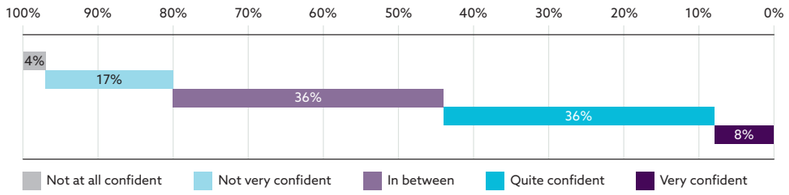
For manufacturers to effectively provide product information in ways that can be used by designers, they need an increasing depth of knowledge and skills in BIM and design information. We asked product manufactures about their assessment of their knowledge and skill levels. Only a minority, 44%, describe themselves as confident, though this is fewer than the 21% who describe themselves as not confident. Thirty-six percent place themselves "in between."

This is a lower level of confidence than we see among the design community, where 55% are confident. However, it is worth bearing in mind that the level of confidence we see among designers has taken years to grow to the current levels. Back in 2012, only 35% of designers described themselves as confident in BIM; now that figure is 55%.

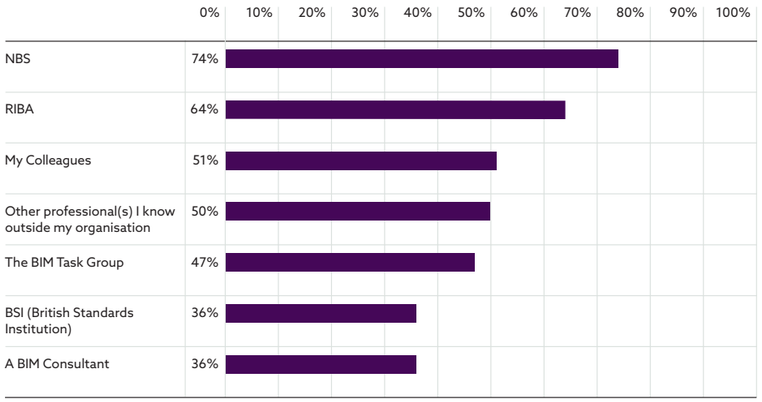
Where are manufacturers turning to learn about BIM? The graph below shows the most used sources, although there are others.

The RIBA and NBS are the most used among respondents.
We at NBS, for example, provide an extensive range of free information at **thenbs.com/knowledge/bim-building-information-modelling**

### How confident are you in your knowledge about BIM?




### How likely are you to turn to the following sources of information about BIM? (Likely or Very Likely)




A majority are also turning to fellow professionals; either colleagues or other professionals outside their organisation. This collaborative approach to BIM reflects what we found among the design community, where three quarters turn to colleagues for information about BIM and 62% turn to other professionals outside their organisation. BIM is collaborative in nature; among and between manufacturers and designers there is a need for the sharing of information and best practice.

Back in 2012, only 35% of designers described themselves as confident in BIM; now it is 55%.



## Getting the information right

The 'I' in BIM is, of course, the information. There is a range of resources to help with producing this information correctly including standards, templates, tools and guidance, much of which is freely available. This section of the report looks at how manufactures view all this, and at the use and awareness of these resources.

The range of information manufacturers need to produce can be wide, and the detail deep. That is why, when surveying the design community, we found that designers need well-structured, standardised information within their models. Poorly created and maintained BIM information can undermine a model and threaten the design intent. It is also likely to mean that products that are represented by poor quality BIM objects will not be as readily selected in the future. Well-structured, standardised information allows for an unambiguous statement of design intent; an intent that can be realised through collaborative working in a BIM environment.

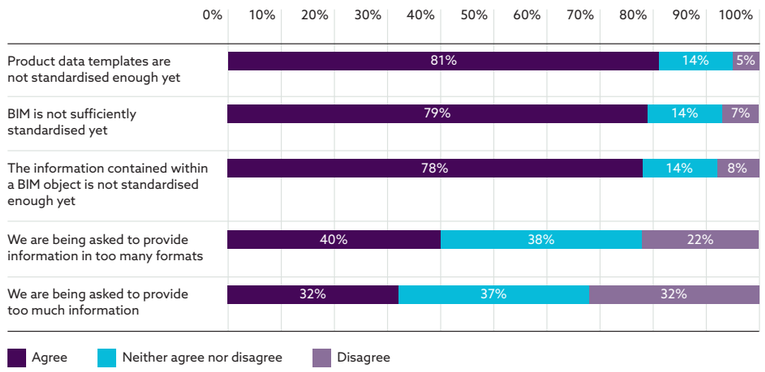
The design community needs manufacturers to provide this well-structured, standardised BIM information.

How well placed are manufacturers to do this? There isn't a strong resistance to the provision of information. Whilst manufacturers are being asked to provide more information in more formats, most don't yet see this as too much information, or too many formats.

*"In my opinion, BIM is still not a standardised practice in the industry."*

There is, however, an issue with standardisation. BIM and Product Data Templates (PDTs) are seen as insufficiently standardised; so too is BIM itself, along with the information contained within a BIM object, as shown in the graph below.

### Agreement with statements?




Manufacturers are aware of some of the resources available to them to help get the information right.

Seventy-two percent are aware of PDTs. Seventy percent are aware of the NBS BIM Object Standard **(nationalbimlibrary.com/nbs-bim-object-standard).**
This standard provides detailed definitions of the information required to create a quality BIM object. It is a guide to consistency in content and structure for BIM information, so it's a vital resource when creating BIM objects.

## Use of Standards

In our report for designers, we mentioned that *'BIM is collaborative. Standards describe the shared process, structures and definitions that allow collaboration. For collaboration to be successful, collaborating parties need to adhere to agreed standards'.*

We found that among designers, whilst a majority had adopted BIM, that majority was not using one consistent standard. BIM is defined by agreed standards, so it is perhaps surprising that more are not familiar with them.

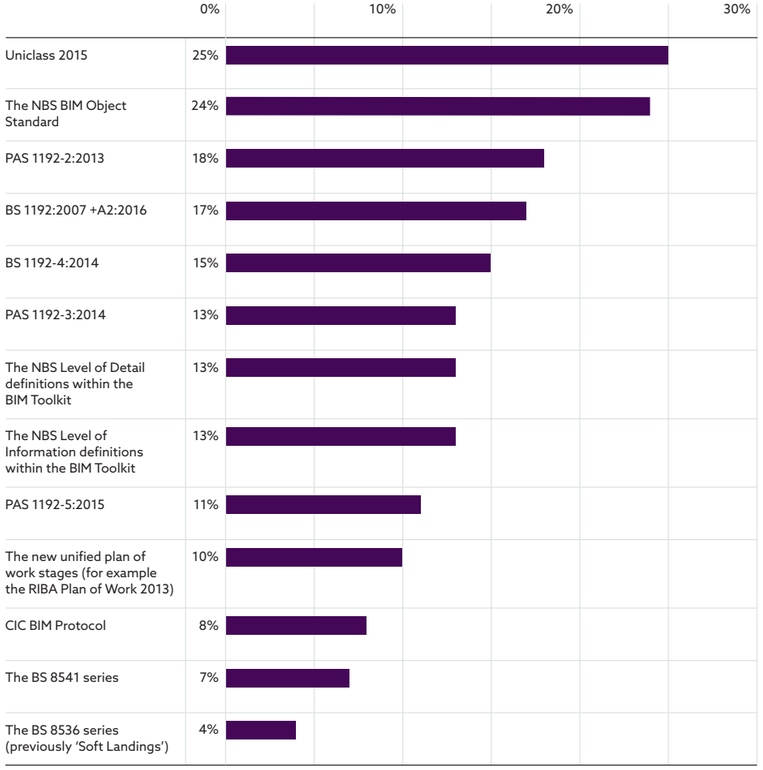
We found a similar picture among manufacturers.

Uniclass 2015 is referenced by a quarter of manufacturers: not a standard of course, but a BIM-compatible classification system, compliant with ISO 12006-2. It allows project and product information to be structured in a standardised way.

PAS 1192-2, which specifies requirements for BIM Level 2, is referenced by 18%, and BS 1192:2007+A2:2016, which describes the collaborative production of architectural, engineering and construction information, is referenced by 17%.

As with the design community, there is support for the wider use of these standards and publications. Uniclass 2015 descriptions and tables are freely available from NBS; as is the BIM Object Standard. The RIBA Plan of Work, with an accompanying toolbox, is freely available at the ribaplanofwork.com. The core standards are freely available at **bim-level2.org/standards**

### Which of the following standards/publications does your organisation reference?




BIM is defined by agreed standards, so it is perhaps surprising that more are not familiar with them.



## Working with designers

*"It is ...beginning to affect how built assets are designed and constructed."*

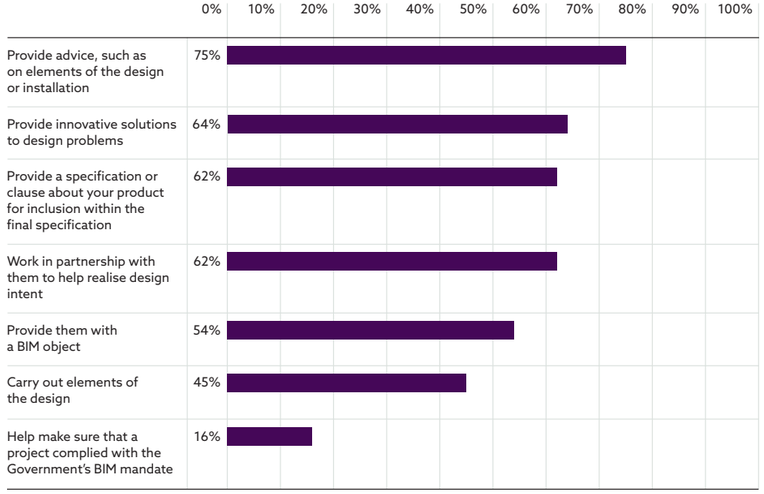
Standards, structured information, well-formed BIM objects - for the manufacturer these serve a purpose; to get products selected in the design stages and help designers defend that selection throughout the construction timeline. To do this, manufacturers are playing an active role in the design process; they are not just handing over information and walking away.

In the graph below, we see that manufacturers are not just providing product information (whether through specifications, 62%, or through providing BIM objects, 54%); they are also advising and helping designers come up with innovative solutions to design problems (64%), or carrying out elements of design (45%). Innovative products, well described, allow for innovative, collaborative design.

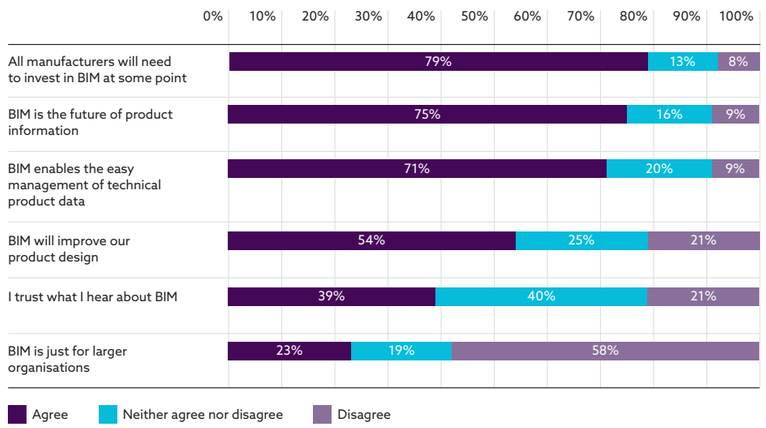
Looking ahead, for designers, the future of the design process is BIM. Seventy-eight percent of designers see it as the future of project information. In the years we have monitored BIM adoption we have seen it become the norm for design practice. It is also clear that manufacturers see BIM as the future of product information; three quarters agree that it is. So, with BIM as the future, it is unsurprising that 76% see the need to invest in BIM at some stage. A majority see that investment paying internal dividends too, with 71% believing it will enable the easy management of technical product data.

*"We have taken a lead in BIM object creation in our product sector which has been an overall advantage."*

### Thinking about where you have worked with designers and contractors in the last 12 months, did you




### Do you agree or disagree with the following statements about BIM?



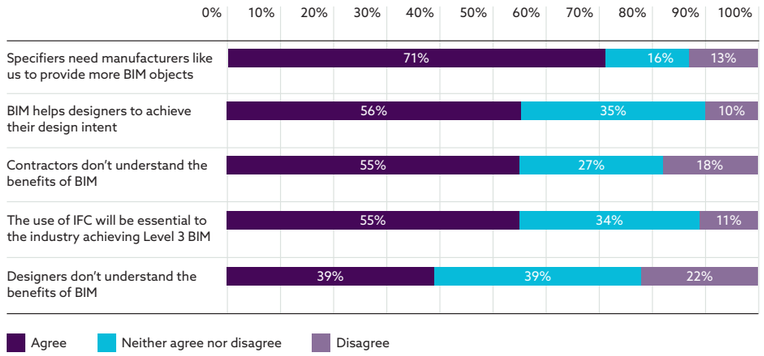
*"If the products are in BIM with all correct information as to exact model to be made in factory then this would speed the process up."*

A majority (51%) see BIM as a means to improving product design. This makes increasing sense when we look towards the future use of BIM, where a rich information model is used to gather and store information about the in-use performance of a building. This can then be compared with what was anticipated at design stage. By measuring the variance between actual and anticipated performance, design can be refined; whether this is the design of a building, a system or a product.

Trust in what people hear about BIM is an issue, as it for designers.

Seventy-one percent of manufacturers say they need to provide more BIM objects for specifiers. The same proportion of designers agree, saying that "We need manufacturers to provide us with BIM objects". The pleasing symmetry here shows that there remains a significant, unmet need for well-structured BIM information to allow accurate product selection within the mandated BIM environment.

**Do you agree or disagree with the following statements about BIM?**




Part of the creation of a well-structured BIM object is the use of IFC (Industry Foundation Classes). IFC is the open and software agnostic format for BIM information. As collaboration increases, particularly as we move towards Level 3, frictionless movement of BIMs between software packages is essential. IFCs are the way to do this, so it is encouraging that a majority of manufacturers see the use of IFC as essential to Level 3 BIM.

A majority of manufacturers feel that BIM helps designers to achieve their design intent. This too seems right; BIM has allowed designers to design in new ways, with many of the design questions asked and answered earlier in the design process using a single, shared, information-rich model.

However, manufacturers see that there is still work to do. Most feel that contractors do not understand the value of BIM. That may be right, but it's a finding that can be put alongside that of designers using BIM, of whom 64% tell us that 'contractors will increasingly insist on us adopting BIM'.

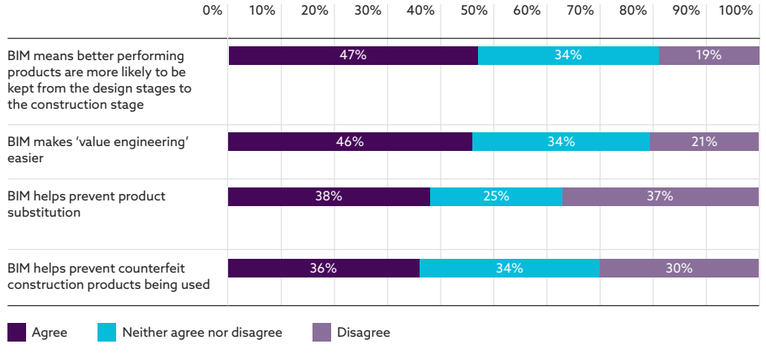
A significant minority (39%) also feel that 'designers don't understand BIM'. Our findings in the NBS National BIM Report suggest that whilst there are designers who do not understand BIM, that number is decreasing. The extent and depth of BIM knowledge looks set to increase among UK designers.

The graph below indicates that people are more likely to see BIM as a means of keeping better-performing products through the design and build process. However, BIM is not magic; it won't make 'value engineering' go away. Indeed, 46% think that it will make it easier. Nor will it, of itself, prevent counterfeit products being used. Manufacturers are evenly split on whether BIM helps prevent product substitution.

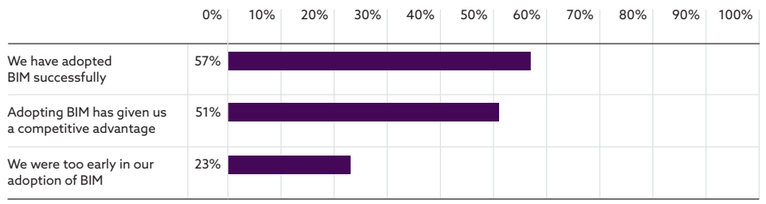
Seventy-one percent of manufacturers say they need to provide more BIM objects for specifiers.



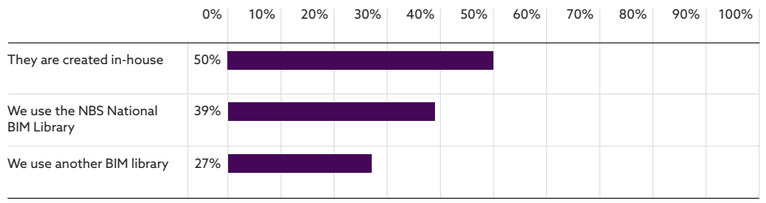
**Do you agree or disagree with the following statements about BIM?**




**Attitudes to BIM - user**




**Where do you get the BIM objects your organisation provides?**




Perhaps the important point here is that BIM provides well-structured information, and so makes the attributes and qualities of a product or system more accessible and so comparable. It allows products that offer better value (and not just lower cost) to be identified and selected against verifiable criteria.

Among manufacturers who have adopted BIM, a minority (less than a third) think they have done so too early. A majority describe BIM as having given them a competitive advantage, and 57% suggest they have adopted BIM successfully. On balance then, BIM adoption benefits a business. Indeed, of those who have not adopted BIM, 63% acknowledge that if they don't adopt BIM they will get 'left behind'.

To provide BIM objects and to become BIM ready, manufacturers are most likely to create BIM objects in-house. Next most popular is to use the NBS National BIM library (39%), then to use another library (27%). Whilst BIM libraries can help get BIM objects in front of designers at the time they need them, it is important to recognise the importance of the BIM objects themselves being well structured and standardised, whatever the means of production. A 3D CAD file with arbitrary product information is not a BIM object.

A majority describe BIM as having given them a competitive advantage, and 57% suggest they have adopted BIM successfully.

Seventy-three percent see that BIM will help bring cost reduction in the design, build and maintain lifecycle.

## The UK Government and BIM

In 2016 the UK's BIM mandate came into force. Through the BIM mandate, any centrally-funded government project needs to be carried out to 'BIM Level 2'. That is to say, it requires collaborative 3D BIM, where all the project and asset information is electronic.

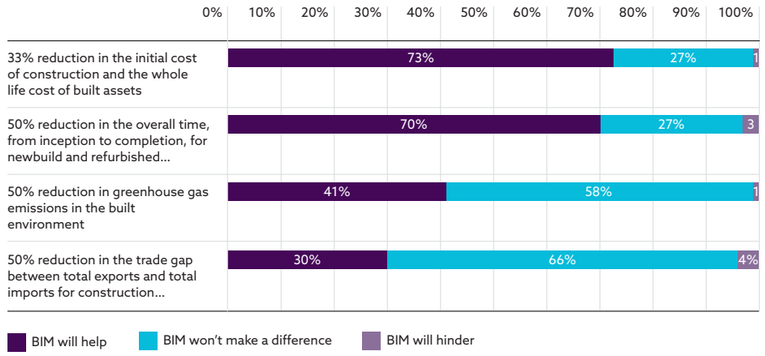
The introduction of the BIM mandate was a part of the Government's construction strategy. This strategy is to meet four ambitious targets of lower cost, more rapid delivery, fewer greenhouse emissions, and a better trade balance for construction products. BIM and the BIM mandate are there to support the meeting of these targets.

The graph below shows manufacturers' assessment of BIM's ability to help meet these targets.

Very few manufacturers think that BIM will hinder our meeting these targets. Seventy-three percent believe that BIM will help bring cost reduction in the design, build and maintain lifecycle. Seventy percent see that BIM will help bring time efficiencies, reducing time from inception to completion. Less pronounced is BIM's ability to reduce greenhouse gas emissions (41% agree that it will help), or improve the trade gap in construction products (30% agree).

However, our survey also suggests that there are real concerns about how, and indeed if, the BIM mandate is being enforced. Nearly two thirds, 64%, tell us the Government is not enforcing the BIM mandate, a view echoed by designers. Among designers, 51% agreed that "the government is not enforcing the BIM mandate".

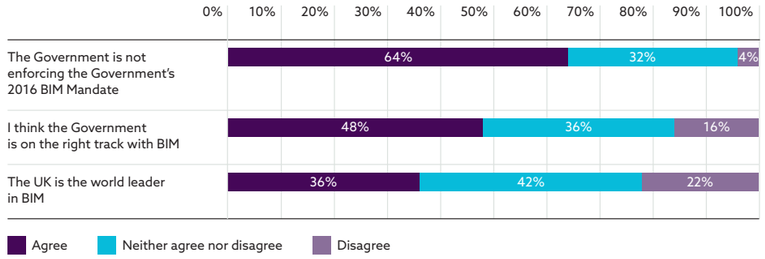
### BIM's ability to help meet targets






NBS

### Do you agree or disagree with the following statements about BIM?




*"The mandate is not being enforced. Not all government departments are using BIM."*

*"The mandate has not been pushed enough, nothing happens if it is not adhered to!"*

This lack of enforcement leads to our next findings. Forty-eight percent, so not quite a majority, think the Government is 'on the right track' with BIM. Over a third think the BIM mandate has been successful (33% telling us it has been 'quite successful', but only 1% 'very successful'), over a half (51%) say it has been 'not that successful' and 16% 'not at all successful'. Reading the free text comments, this assessment is not about the mandate per se; the manufacturers who completed the survey see the value BIM can bring. It is more a perception that the Government has not followed through on the mandate with rigorous enforcement.

*"The Government hasn't enforced the mandate for all of its projects."*

Perhaps this is part of the reason that 36%, rather than a majority, see the UK as a world leader in BIM.

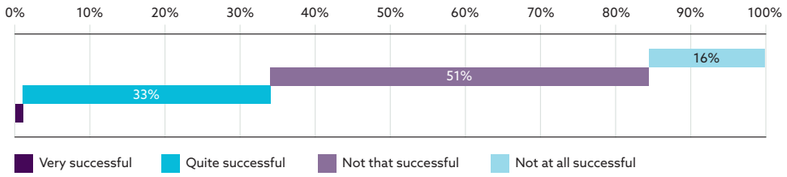
The BIM mandate was linked to our adoption of a world-leading position.

*"This whole sector approach to BIM will see the UK as the world leader in a new digitally built era, offering new ways of working, as well as massive growth potential both at home and abroad."*

**Francis Maude**
Government Construction Summit

The vision of the UK being the world leader in BIM has yet to be fully realised, according to product manufacturers (and the design community, where only 19% agree that we are the world leader). That said, the UK is certainly one of a handful of countries that is leading BIM development and implementation. Other countries are looking to the UK to learn what we are planning, doing and have done, to inform their own BIM strategy.

### A year on from the UK Government's 2016 BIM mandate, how successful do you think this initiative has been?



## End note

*"Let's get the ball rolling!"*

In our NBS National BIM Report 2017 we found that BIM adoption in the UK is growing in both extent (more designers are using BIM) and in depth (designers are increasingly being more sophisticated in their use of collaborative BIM). Construction product manufacturers mirror this increase in adoption. Many are producing BIM information now, more will do so in the future, and more products will be described in BIM-ready ways.

The introduction of the Government's BIM mandate has gone hand in hand with this. For designers, the BIM mandate has broadly been a success, spurring BIM option and use. Manufacturers are a little more circumspect. Both agree, however, that the Government is not enforcing the BIM mandate. Comments from both groups suggest there is work the Government can do here. Work that is, perhaps, as important as the introduction of the BIM mandate.

Nevertheless, the message is clear – BIM is the future of design, and for manufacturers this is creating an increasing demand for well-structured, standardised BIM objects that give confidence to designers when choosing to include them in the overall model.

*"Spread the word about BIM and its benefits to the industry."*

**In terms of the future of the construction industry, how likely are the following technologies to have a significant influence?**




At the same time as the BIM mandate coming into force, we also see rapid political and economic change as the Brexit process slowly unfolds, bringing as yet unknown effects on our diverse design teams and our complex construction product supply chains.

As we noted in our National BIM Report, we also see the rapid, at times astonishing, growth and development of data capture, exchange, aggregation and interrogation. This is bringing new ways of working, and of working together.

Information is also changing how products - whether apps, cars or jet engines - are produced. Real-time data capture and performance evaluation allows continuous design evolution. The value of a product is decreasingly held within the product itself, and increasingly in the data held about it. This has significant implications for product manufacturers, not just in selection and use, but also in their design and, in time, their production.

BIM is likely to be just the start.

The graph above suggests some of the things product manufacturers see coming next, and their influence: An internet of connected products, produced by 3D printing, with performance analysed and refined by big data (held in the cloud), created by robots who learn for themselves. Is this how the building blocks of future cities - construction products - will be?

Perhaps, or perhaps not. What seems clear is that it is a safer bet to create well-structured data about products - sooner rather than later.

# Structured product information – Why is it important?

**Drew Wigget**
Head of Product Information, NBS

**We expect to be able to carry out tasks now far quicker than we ever have before - whether in our private life or our work environment. Within minutes we can assess our options, make a decision and purchase an item, all with a few swipes of our smart phones, then track its delivery. Why then as an industry do we not have similar processes for construction product selection available to us?**

There is no right or wrong method for coming to a decision about selecting a construction product. Decisions can be made based upon performance criteria, certification, location, pricing, availability or green credentials - the list is endless.

Designers have a thankless task of specifying construction products, and those who suggest alternatives such as contractors further down the line also have a similar task in comparing products.

Why is this so? What could the industry do better to allow specification and product comparison to take place in a more efficient manner?

At the heart of the issue is product information - data describing the manufacturer's products - and a consistent method of collecting and presenting this information.

The industry is not great at making product information available consistently. This is holding the industry back and will certainly not assist manufacturers wishing to work in a BIM environment.

At the heart of the issue is product information - data describing the manufacturer's products - and a consistent method of collecting and presenting the information.



| Manufacturer Name | Warner Howard | Dyson | Intelligent Facility Solutions Ltd | Ecoprod Technique |
|---|---|---|---|---|
| **Form** | High velocity warm air | High velocity cold air through HEPA filter | High velocity air | High velocity air through HEPA filter |
| **HandDryingTime** | 12-15 seconds | 10 seconds | 11-23 seconds | 9-11 seconds |
| **ModelReference** | 5500E Hand Dryer | Dyson Airblade dB | eXtremeAir CPC Hand Dryer | Urimat Favorit Hand Drier |
| **IP_Code** | IP24 | IP24 | IPX1 | IPx4 |
| **Uniclass2015Code** | Pr_40_70_62_37 | Pr_40_70_62_37 | Pr_40_70_62_37 | Pr_40_70_62_37 |
| **Uniclass2015Title** | Hand driers | Hand driers | Hand driers | Hand driers |
| **Weight** | 3.0 kg | 8.2 kg | 3.62 kg | 11 kg |
| **Size** | 265 x 220 x 180 mm | 661 x 303 x 247 mm | 230 x 249 x 143 mm | 330 x 220 x 685 mm |
| **Material** | Die-cast aluminium | Polycarbonate-ABS | ABS/ Steel | ABS |

## Examples of structured product data in use

The NBS works with many manufacturers, collecting product information and presenting that information through services such as NBS Plus and the NBS National BIM Library.

The example above shows product information that has been collected for a number of hand dryer manufacturers. In this instance this information has been added to BIM objects for inclusion within the NBS National BIM Library. This information would have been equally useful in a product website or specification tool.

When viewed side by side in this format, a designer is presented with well-structured information that may assist them in the specification process.

The challenge the industry has is that in this instance, NBS has carried out the work to interrogate a manufacturer's data sheets and brochure and has then aggregated that product information following a standard process. This exercise is not always easy to do and can be very time consuming, generally involving an interactive process and requesting more information or clarification of information from the manufacturer.

**Above**
*Structured product information for a range of hand driers.*

Working with a company that aggregates product information will assist manufacturers as there will be consistency in the information delivered.

## What options are available for manufacturers to assist them in structuring product information?

As demonstrated in the example on the previous page, working with a company that aggregates product information will assist manufacturers as there will be consistency in the information delivered. NBS can provide this service. However, this solution doesn't suit all manufacturers and some will want to get their house in order internally and distribute structured product information across many channels in the industry.

This is great in principle but still a challenge for the industry. At this stage let's introduce the idea of product data templates. An idea that has been discussed in the industry now for a few years with little momentum or adoption.

Product data templates are a collection of terms to describe a construction product. In principle that sounds quite simple, but in practice a lot of questions have been raised regarding who is best placed to collate the terms for a product data template, and how we can ensure that a common plain language is used across the industry.

These are very valid questions to raise and there are several initiatives being developed that will aim to satisfy these questions.

In the meantime, however, manufacturers are left stranded. Some want to engage and structure their product information, but what is available for these manufacturers?

One option for manufacturers is to utilise the product data templates that are made available through the NBS BIM Toolkit. These templates use the same terminology as the generic specification that NBS has been developing now for over 40 years. The templates are regularly updated to reflect changes in the industry and the introduction of new product types, and there are over 5000 templates to download. The templates are a great starting point for manufacturers and will assist them in standardising the presentation of their product information.

The templates are a great starting point for manufacturers and will assist them in standardising the presentation of their product information.



## What is the industry doing to tackle the issue of product data templates?

There are a number of initiatives developing in the industry. These include:

- The European Committee for Standardization CEN/TC 442 WG4 TG2 Product Data Templates
- PAS 1192-7 Specification for defining and maintaining structured digital product information used for the design, construction and use of a product or built asset
- LEXiCON - developed by the Bre on behalf of the Construction Products Association.

The CEN/TC 442 WG4 TG2 Product Data Templates initiative is looking to implement a framework for product data templates based upon harmonised technical specifications under the Construction Products Regulations.

The Construction Products Regulations:

- Lays down harmonised rules for the marketing of construction products in the EU.
- Provides a common technical language to assess the performance of construction products.
- Ensures reliable information is available to professionals, public authorities, and consumers, so they can compare the performance of products from different manufacturers in different countries.

PAS 1192-7 Specification for defining and maintaining structured digital product information used for the design, construction and use of a product or built asset. This publicly-available specification is at the early stages of development. The scope of the document will be a development, approval and management process to create peer-reviewed product properties and product data templates.

The LEXiCON project being developed by the CPA will be an online solution for trade organisations and governing bodies to create product data templates, and it is assumed this will be developed in line with the work being carried at CEN and PAS with the British Standards Institute.

The industry is certainly making some good progress with these developments. However, the development of new standards and processes take time. This does leave manufacturers currently scratching their heads as to what they should be doing now.

Manufacturers should be bracing the digital environment, refocusing marketing and technical budgets away from printed material, and structuring product information so that it is suitable for the many channels where it can be published.

**Useful reading:**

*standards.cen.eu/dyn/www/f?p=204:7:0::::FSP_ORG_ID:1991542&cs=16AAC0F2C377A541DCA571910561FC17F*

*www.construction-products.eu/news-events/latest-news/pas-1192-7-drafting-process.aspx*

*thenbs.com/knowledge/standards-supporting-uk-innovation*

*constructionproducts.org.uk/news-media-events/news/2017/march/lexicon-a-single-process-for-bim-data/*

# BIM – a manufacturer's journey

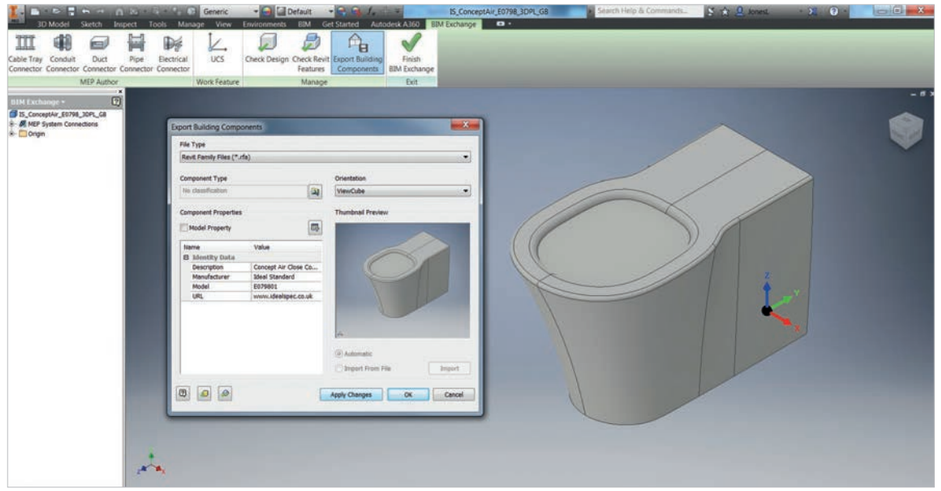
**Lee Jones**
European BIM Manager

**Ideal Standard International is the world's leading manufacturer of bathroom and washroom solutions. The company provides bathroom furnishings, fixtures and shower enclosures for residential, commercial and institutional buildings. UK brands include Armitage Shanks, Ideal Standard and Sottini. Celebrating 200 years in business this year the company, based in Staffordshire, is the only remaining large-scale sanitaryware manufacturer in the UK.**

Ideal Standard has been at the forefront of new technology for many years, making use of 3D CAD for almost 20 years. Specialised software is used to design products, which allows us to simulate the effects of firing clay through the kiln. The reward in simulating production of any type prior to full manufacture is indisputable: reductions in errors, time and costs whilst increasing sustainability are amongst some of the key benefits. These are ultimately the same holistic promises that BIM offers a whole project.

The Ideal Standard BIM journey began back in 2013. The CAD element quickly turned out to be only a small piece of the puzzle; for us, it was where we started. We had a single seat of Autodesk Inventor at the time, which was used for some specialist project work alongside our main software. At the end of that year we began to receive requests for Revit files and as we knew that Inventor could export to Revit (.rfa) format, we began there.






**Left**
*Preparation of existing CAD geometry in Autodesk Inventor for export to Revit.*

As the company progressed with the Revit family creation methods, using both imported CAD and eventually native modelling techniques, it became apparent that the key to an efficient functioning BIM model was the file size. A production CAD model for a toilet pan is around 40Mb upwards. Most of the projects (entire building designs) we came across in Revit were only three times this size and, as the average basic house contains around 3000 individual components, it was obvious that the original CAD models needed to be much lighter for BIM use.

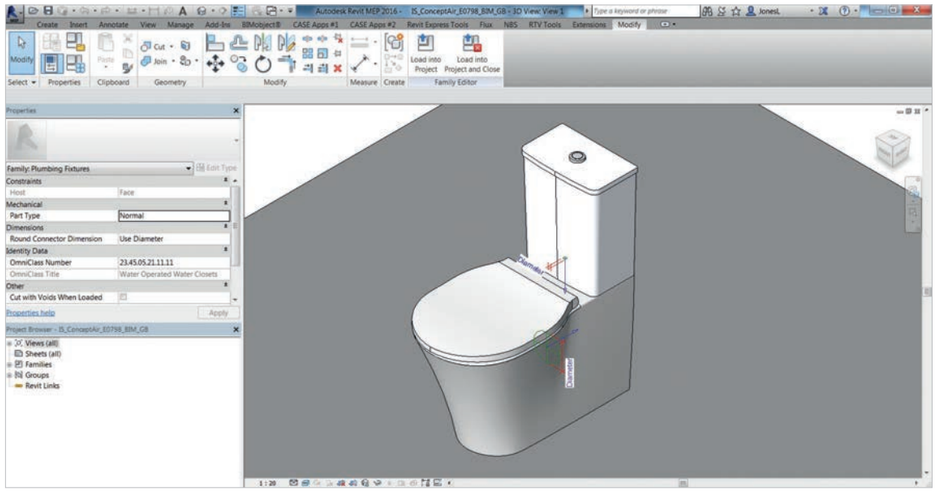
For the company's products today, it is currently not possible to manufacture from the BIM models (although this is possible for other building elements). The product geometry for our BIM models is used solely for architectural planning, rendered visuals and as a placeholder for specification only by the architect or designer.

This allowed us to settle on geometry that just resembled the finished product externally and with no functional detail within, aiding IP security at the same time. Advances in processing capability will, no doubt, result in the ability to one day increase file size. It is likely that this will not always be an issue in the long term, but for now though the situation exists. For anyone considering creating their own BIM objects, the important thing to note is that even as a secondary process it was not highly labour intensive. For the SME, things like monthly subscription software packages could, theoretically, make this a 'short-term project' scenario for one person, with certain ROI.

By 2014, BIM was quickly becoming the 'buzzword' amongst the industry. Early that year, Ideal Standard made the decision to roll out BIM for the specification side of the business. A BIM champion was employed.

For anyone considering creating their own BIM objects, the important thing to note is that even as a secondary process it was not highly labour intensive.

**Right**
*BIM object complete with nested ancillary components and MEP connections.*



The data within our models had to come from us: leaving the data to someone else to find and federate could result in errors.

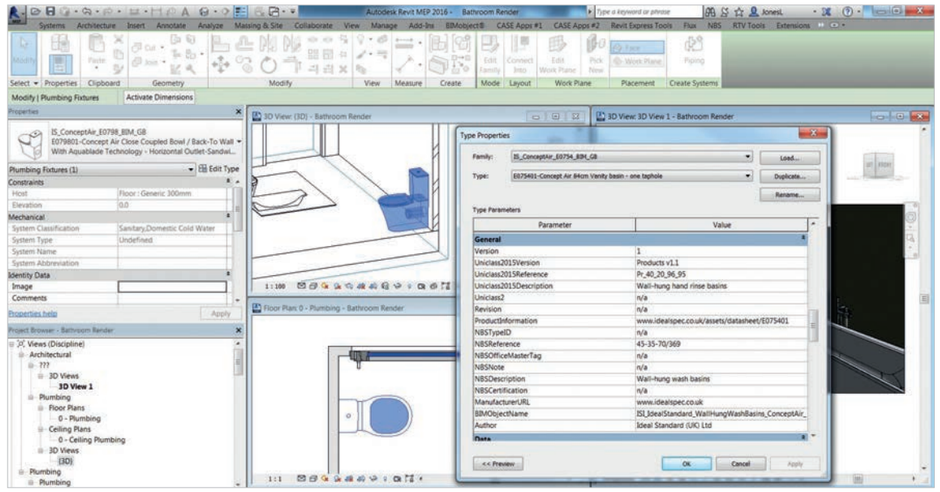
The first task was to kick-start a research project: to fully understand what BIM was, what it meant for the business and, importantly, what it meant for our clients. In the UK, there were a handful of criteria that we quickly understood we needed to satisfy:

- The object geometry needed to have high visual quality but be small in file size.
- Concise data within the models was needed.
- To aid Level 2 BIM compliance, part of this data had to be COBie UK compliant.

The data within our models had to come from us: leaving the data to someone else to find and federate could result in errors, or even a competitor's data being used and specifications being lost! All manufacturers have product data – structuring this is, therefore, the only effort within BIM content creation.

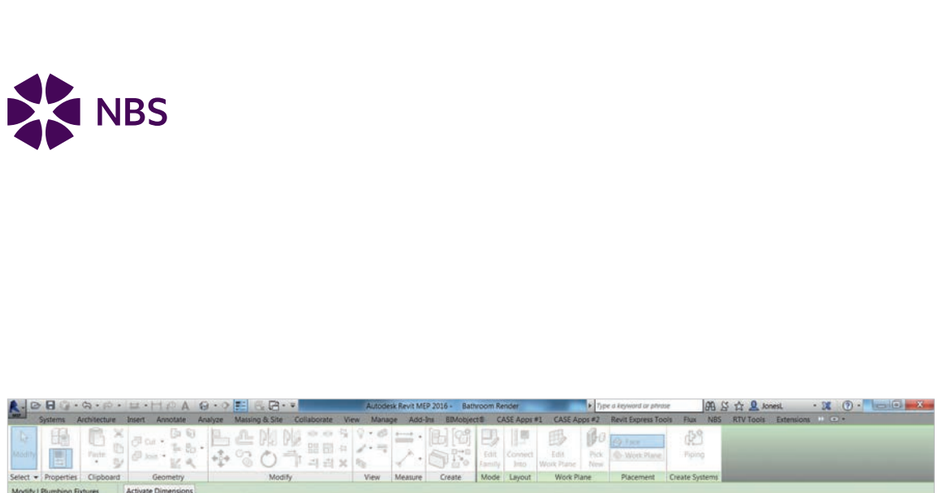
Data was then mapped to COBie and other data sets. The NBS shared parameters file contains all the necessary fields, so it was used for this purpose to speed up the process. At the time, this was a script file that required linking to Revit; it is now offered free in an easy-to-use downloadable Revit app. Through applying some simple work streams, the company's BIM creation became a very efficient process and quickly became an asset. When the journey began, BIM was relatively new to the industry and knowledge was short. Today, there is a lot of industry knowledge, alongside publications from numerous organisations that can be relied upon.





**Top**
*BIM data example within the object shown when inserted into a project.*

**Below**
*Multiple views of the object shown within the project*



When the journey began, BIM was relatively new to the industry and knowledge was short. Today, there is a lot of industry knowledge.

**Right**
*Rendered view of the bathroom created within the project.*

BIM has opened doors for the company with numerous contractors, architects and other industry professionals.

Ideal Standard officially launched their BIM entity in spring 2015, receiving an extremely positive response. BIM has opened doors for the company with numerous contractors, architects and other industry professionals. It has resulted in remarkable results, including being awarded sole supplier agreements with contractors, and taking share from competitors on various projects. BIM has positioned us as leaders in this digital arena.

On an internal level, it has helped structure product data far more effectively. Today, objects are created in multiple formats including Revit, ArchiCAD and IFC. Content is hosted online; from each download made, analytics are captured to understand the use of our BIM models in more detail, aiding us to build a relationship with users. We are now fast approaching some half a million downloads since going live.

To reflect on the company journey and the historical data capture from analytics, it is obvious that BIM is continually growing. There may not have been the overnight tidal wave that many were expecting following the 2016 mandate. The response to the government deadline was a little underwhelming; however, it is progressing. Whether it continues to be known as 'BIM', 'digital construction' or something entirely different, one thing for certain is that in the not too distant future, we will look back and it will have become the norm. The BIM journey is one which Ideal Standard are excited to be part of; one with clear rewards, and one which we will continue to progress.

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