



What Good Data Looks Like

Exploring Quality Issues in BIM

GEBERIT





Introduction

Building Information Modelling (BIM) is a comprehensive process of producing and managing data for a built asset. Integrating structured, multi-disciplinary data within design and modelling software, BIM creates a digital representation of a building across its life cycle—from planning and design to construction and operations.

To work to its full potential, the digital objects within the BIM must reflect the real-world specifications of a product. Architects and designers must work with manufacturers to obtain manufacturer-specific BIM objects that contain all the information necessary for their building model. With the use of BIM objects, designers may simulate the effectiveness of various design solutions and make meaningful comparisons between them.

Globally, BIM is commonly regarded as a best practice method for completing large-scale construction projects because of its reputation for increasing efficiency. However, while its use has grown over recent years, the industry is still tackling several challenges with the same root cause: data quality.

Making aesthetically beautiful designs is only one aspect of maintaining a high-quality reputation as an architect or designer. The precision and calibre of the data utilised to construct the design ultimately determines the success of the end product. Below we explore common data quality issues faced by all architects and designers, and how a leading sanitaryware manufacturer is responding to make digital design and planning easier and more reliable.

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BIM at a glance

BIM software uses advanced 3D modelling technology to create a digital representation of a construction project before it is built. This model can contain information on design, construction, logistics, operation, maintenance, budgets, schedules and more. With the aid of this data, a virtual building model is created that can be examined from all angles and perspectives.

This process enables architects, engineers, and construction specialists to collaborate on a building in three dimensions and across its entire life cycle, with a wealth of data related to 3D objects in the building. The model is filled with information that details the building's geometry, materials, systems, and components.

According to a recent analysis by Dodge Data & Analytics, 92% of BIM-enabled enterprises in Australia and New Zealand will be using BIM on more than half

of their projects by 2024.¹ This highlights the growing recognition across the industry of BIM's many benefits, including:²

- accurate, timely and intelligent transfer of information between key project stakeholders;
- greater certainty between design intent and the final construction and operation of the building;
- fewer errors, reduced rework, shorter project durations and lower overall construction costs;
- precise design and trade co-ordination, automated conflict avoidance, easier design interpretation, greater accuracy and fewer change orders; and
- real-time performance monitoring and asset management processes leading to high-quality post construction outcomes.

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The challenge of data quality

One of the most pervasive challenges with BIM data is that it comes from multiple sources—different disciplines, manufacturers, and software—all of which may create, maintain or present data in different ways. There is no guarantee that data quality will always be consistent, reliable and accurate across the entire building life cycle; for architects, designers and engineers, there are simply too many requests and deadlines to meet to verify everything. This can make it difficult for firms to fully leverage the benefits of the BIM process.

Take, for example, the specification of sanitaryware. Manufacturers in the sector are increasingly making BIM objects available for download. These BIM objects

are sometimes created in-house, or by a third-party service provider. The BIM objects are made available in various data formats on several online hosting platforms and may be updated only occasionally.

The problem is that the design and planning phase of major projects can last several years, with data changing hands across a range of stakeholders. In between the tender phase and when the products are ordered, the product that corresponds to the BIM object on the site may have been discontinued or redesigned to the point that building plans need to be adjusted. In the worst-case scenario, this use of outdated data will lead to project delays and rework.

Limitations with manufacturer-specific BIM content

Manufacturer-specific BIM content, which not only depicts the physical properties of the products but also contains other crucial data like product information, installation guidelines, and other specifications, is becoming essential in the BIM process. However, creating and managing this information is not without its challenges.

As most manufacturers produce static objects, creating BIM objects for every single product variant relevant to planning, as well as derivations in local languages, is expensive and time consuming. As a result, few manufacturers regularly update their BIM objects, and they would only create fresh BIM files for entirely new products.

Depending on the size of the effort, manufacturers sometimes engage with a third party to create BIM

objects using their specifications and information. This process, which requires the manual transfer of data and knowledge, can result in missing or inaccurate information in the BIM object. Additional resources are required to check and verify that all the information is correct and up to date.

For BIM objects, maintaining data quality requires a single-source strategy. Manufacturers face significant challenges because of the multidimensionality of BIM object data (e.g., different languages and locales) as well as the varying product ranges across different markets. Opening and maintaining an additional data channel would be necessary to provide updated BIM objects on an ongoing basis, but this is a sizable workload and presents organisations with significant data and process management issues.





What happens when data quality is overlooked

In September 2021, Autodesk and FMI Consulting released a study on the prevalence of construction data usage and the losses resulting from data errors. The study showed that poor-quality data may have caused approximately \$1.8 trillion in losses worldwide and 14% of avoidable rework that amounted to \$88 billion in costs.³

When there are no strategies in place to ensure high-quality data in BIM-dependent projects, substantial losses in terms of efficiency, costs

and accuracy are almost a certainty. The potential risks and consequences include:

- the use of outdated dimensions from older product models;
- the use of obsolete or discontinued products before construction begins;
- miscalculations based on human error or inaccurate data;
- incompatible product selections; and
- clashes between major building services.

What does good data look like?

For architects and designers to maximise the return on investment from BIM, it is crucial to work with vendors and decide how to effectively use the data gathered. It also is beneficial to be selective with the manufacturers you work with and ensure they too have effective data governance processes in place.

When assessing the quality of data, the below factors should be considered as a guide:

- **Accuracy.** The key question is whether the information used in the data model reflects reality. BIM files must not only be accurate, but also up to date.
- **Consistency.** This measures whether each occurrence of a data point in all sources exists and is the same.

- **Completeness.** Ensure that all required information about the product is contained in BIM objects, allowing users to access it in their BIM software and preserve it throughout the duration of the project. In other words, does the object have all the values needed for this stage of the project?
- **Timeliness.** The data must be up to date and represent reality for a required time period. Ensure that the manufacture proactively notifies users when their products have been updated.
- **Interoperability.** Flexibility and versatility are two major advantages of structured data. BIM objects should be widely recognised within the larger ecosystem of digital tools that can be used throughout the built asset's lifecycle, offering a broad range of potential applications.

Reliable BIM content from Geberit

Geberit combines their passion for quality and technology with almost 150 years of sanitary knowledge to offer reliable products and services that truly make life easier for you. The company offers innovative and sustainable plumbing solutions that help to gain additional living space and deliver hygiene and comfort to end users. Their services include assisting architects, designers and specifiers with proper planning, logistics, installation, training, and product maintenance to ensure the success of their projects.

To support BIM design and planning, Geberit offers manufacturer-specific BIM content in addition to conventional CAD data and intelligent tools. The Geberit BIM content consist of parametric 3D models that contain article-specific meta information. Their comprehensive approach ensures reliable and consistent data, allowing Geberit products to be incorporated easily and efficiently into even large and complex projects.

Single source approach for accuracy in data information

The direct connection to the Geberit product information management system ensures that the user only downloads tested and approved BIM objects. Incorrect or outdated BIM content is no longer a problem.

Efficient planning with management models

Geberit relies on highly simplified, parametric geometries with all meta information that is relevant for planning in the background. This avoids overloading CAD systems and allows for efficient planning.

The BIM objects for Autodesk® Revit® are provided in the form of Revit families, not as Revit project files. In the case of Geberit drainage systems, for example, all pipe dimensions and fittings that are relevant to the pipe routing are loaded simply by double-clicking in the Geberit BIM Catalogue. That means everything that is required for efficient planning, but without redundant information. If special fittings are required, they can be selected individually from the BIM catalogue.

Sanitary elements are also structured based on parameters as far as possible, providing huge added value in the planning process as all settings can be adjusted for the sanitary element in question. This means that the frame height or connection bend angle can be adjusted in the properties, alongside other parameters.

Direct access to BIM content

With the Geberit BIM Catalogue for Autodesk® Revit®, Architects are given direct access to BIM content for Geberit drainage systems, installation systems and bathroom products. Using a plug-in that they install in Autodesk® Revit®, they are presented with a practical product catalogue from which they can download BIM models directly to the project as required. This eliminates the need to search for individual BIM models on different platforms.

Supports manufacturer-neutral tender

In addition, Geberit has also introduced a new function to allow architects to present their plans without brand favouritism.

With just a single click, the manufacturer-specific and model-specific data in the built-in parameters are set to manufacturer-neutral and replaced by generic descriptions. After the tender has been issued, the manufacturer-specific parameters can be restored with just another click. This function does away with the painstaking task of replacing objects in the BIM model and significantly reduces the amount of work required.



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