UK BIM FRAMEWORK

ISO 19650 Guidance B: Open data, buildingSMART and COBie

UK BIM FRAMEWORK HOME

Editions (Guidance B)

Aa Edition	≡ Date of release	≡ Description
Edition 1	September 2020	First release.
Edition 2	November 2022	Removed the word 'Part' from the title of the document to remove possible confusion with parts of ISO 19650.

Table of contents

List of figures

List of tables

Abbreviations and acronyms

Refer to ⊙ <u>Abbreviations and acronyms</u>.

About this guidance (executive summary)

The guidance framework supports the UK implementation of the ISO 19650 series.

This guidance document (guidance A) sits within an overall guidance framework as shown in Figure 1.

Who is this guidance written for?

This guidance is for people undertaking the information management function on behalf of an appointing party (a client) or a lead appointed party (for example, a project manager, designer or a main contractor).

Who is this guidance of particular interest to and why?

This guidance is of interest to all parties and teams involved in the information generation, delivery and management processes.

Key takeaways

- The formal requirements and recommendations around information management (the ISO 19650 series) were developed with open data at their centre

- Organizations can derive significant improvements in cost, value and operational performance through the use of open shareable asset information

- Data is considered open when it is not restricted to specific software solutions while proprietary data is restricted to specific software Examples of open data file formats include HTML, PDF, PPTX, MP3, and IFC

- buildingSMART is an international organization that champions open data for asset design, construction and operation . It is behind several solutions (IFC, IDM, MVD, BCF, bSDD) that support people in their use of open data.

- The buildingSMART solutions alongside other open data file formats will help readers to work in accordance with the ISO 19650 series.

As with all guidance supporting the UK BIM Framework, we invite comment and feedback on this guidance B at <u>guidancefeedback@ukbimframework.org</u>.

<u>https://whimsical.com/guidance-structure-X1BF9Phan3rc6o1Qyrb5Bq</u>

Figure 1: ISO 19650 guidance framework

1.0 About open data and buildingSMART

1.1 Context

Innovations around information within the built environment have typically been developed from a software-centric mind-set using proprietary structures and schema. Consequently, these innovations inadvertently introduce barriers hindering the open exchange of information. As identified within Data for the Public Good (2017), using open data gives the UK an annual economic benefit of ~ £8.9bn. This report also recommends further improvements in both the quality and openness of data to enable better collaboration. As such, innovations should start from a common base, utilizing non-proprietary structures.

Throughout a design and construction project, information will pass through multiple software solutions. During these exchanges it is the information, not the software used, that provides value. The software is merely a tool. As we digitally transform the built environment through initiatives such as the UK BIM Framework and National Digital Twin Programme, the tools used by our sector will change, while information needs to remain accessible and interpretable for the whole life of an asset.

Without considering the structure of this information, there is a risk that it will not be interoperable. This may introduce the need for configuration, which could result in additional costs, loss of information quality or degradation. By ensuring that information is structured in an open and consistent manner from the outset of a project, these issues can be mitigated.

It is for this reason that for almost a decade, open data has been cited within UK Government strategies. For example, as part of the UK

Government's BIM Working Party's Strategy Paper (2011), a key hypothesis was outlined:

Government as a client can derive significant improvements in cost, value and carbon performance through the use of open shareable asset information.

Since this initial hypothesis, the formal requirements and recommendations around building information modelling (BIM) and information management have developed, with open data at their centre. The need for open data is acknowledged within the ISO 19650 series. ISO 19650-1, clause 6.1 outlines the principles of the information delivery cycle, stating that information exchanges should be done using open standards whenever possible. This is also reiterated within ISO 19650-2, clause 5.1.6 and the UK-specific national annex.

1.2 Open data

Generally, data produced within software can be categorized as proprietary data or open data. Open data can be defined as:

Open data data available/visible to others and that can be freely used, re-used, re-published and redistributed by anyone [1]

Put simply, the ability to read open data is not restricted while proprietary data is restricted to specific software solutions.

For example, this distinction is significant for archiving purposes because it will affect how to record and store information. Assets, including building and infrastructure works, can be designed and constructed for significant lifespans. There is no guarantee that future software solutions will have the ability to access and interpret proprietary information about these assets. Using open data will resolve this issue.

In reality, open data is more prevalent than might be thought. Examples of file formats that utilize open data, known as open formats, include: HTML, PDF, DOCX, XLSX, PPTX, ODT, ODS, ODP, IFC, PNG, GIF, MP3, CSV, and ZIP.

[1] ISO 5127:2017 Information and documentation - Foundation and vocabulary

1.3 buildingSMART

Within the built environment, there is an international organization that champions open data, buildingSMART:

- buildingSMART is the worldwide industry body driving the digital transformation of the built environment. buildingSMART is committed to delivering improvement by the creation and adoption of open, international standards and solutions for infrastructure and buildings. buildingSMART is the community for visionaries working to transform the design, construction, operation and maintenance of assets. buildingSMART is an open, neutral and international not-for-profit organization. buildingsmart.org/

buildingSMART has developed a series of standardized solutions to support the built environment in its use of open data:

- **Industry Foundation Classes (IFC)**: An industry-specific schema, extension and file format definition. IFC is specified within ISO 16739.

  For example, IFC datasets can be used to share information consistently; enabling information exchanges across a wide array of software solutions and databases.

- **Information Delivery Manual (IDM)**: A methodology for defining and documenting business processes and information requirements. IDM is specified within ISO 29481-1.

  For example, common processes such as the checking, reviewing and approval of information should be articulated as an information delivery manual.

- **Model View Definition (MVD):** buildingSMART sanctioned implementation of the IFC schema to satisfy a specific purpose.

  For example, the IFC coordination view MVD could support spatial coordination by reducing larger geometrical models to the relevant information, which is filtered into IFC datasets.

- **BIM Collaboration Format (BCF)**: A model-based software-independent communication protocol.

  For example, issues raised during spatial coordination, site inspections or snagging could be communicated using the BIM Collaboration Format, as opposed to a lengthy email chain.

- **buildingSMART Data Dictionary (bSDD):** A standard library of general definitions of asset- related objects and their bSDD has been developed following the requirements within ISO 12006-3.

> For example, properties required as part of an information requirement could be linked to properties within the buildingSMART Data Dictionary to prevent any ambiguity around the naming of properties or the type of data expected within them.

Links to the requirements and recommendations that constitute these solutions can be accessed from <u>buildingSMART.org</u>

1.4 buildingSMART standards and the ISO 19650 series

The buildingSMART solutions support conformity to the ISO 19650 series. For ISO 19650-2 the way this can be accomplished is illustrated in the examples below:

<u>ISO 19650-2 clause 5.1 Assessment and Need</u>

5.1.2 Establish the project's information requirements. Using the IFC schema, these requirements could be structured in a machine-interpretable and machine-testable manner.

5.1.4 Establish the project's information standard. Requirements for information exchange within this resource could reference MVDs. An example of an MVD is COBie 2.4.

5.1.5 Establish the project's information production methods and procedures. This resource could use IDMs to articulate methods and procedures.

5.1.6 Establish the project's reference information and shared resources. These resources could be the IFC schema itself, or project information shared as IFC datasets.

<u>ISO 19650-2 clause 5.2 Invitation to Tender</u>

5.2.1 Establish the appointing party's exchange information requirements. Using the IFC schema, these requirements could be structured in a machine-interpretable and machine-testable manner.

<u>ISO 19650-2 clause 5.3 Tender Response</u>

5.3.2 Establish the delivery team's (pre- appointment) BIM execution plan. Elements of this resource, such as the high- level responsibility matrix and the federation strategy, could utilize the classes within the IFC schema.

<u>ISO 19650-2 clause 5.4 Appointment</u>

5.4.2 Establish the delivery team's detailed responsibility matrix. Further development of this resource could utilize classes, property sets and properties within the IFC schema and the buildingSMART Data Dictionary.

5.4.3 Establish the lead appointed party exchange information requirements. Using the IFC schema, these requirements could be structured in a machine- interpretable and machine-testable manner.

<u>ISO 19650-2 clause 5.5 Mobilization</u>

5.5.3 Test the project's information production methods and procedures. By using MVDs and IDMs, a measurable and testable methodology and delivery mechanism can be established.

<u>ISO 19650-2 clause 5.6 Collaborative Production of Information</u>

5.6.2 Generate information. Information generated could be delivered as IFC datasets. In addition, information generated relating to issues throughout the design process could be exchanged using the BCF.

5.6.3 Undertake quality assurance check. The methodology for checking the quality of information could be described as an IDM. The use of the IFC schema and/or IDMs could also support the partial automation of this activity through the establishment of rule-based checking. Such rules could test information against the relevant MVDs.

5.6.4 Review information and approve for sharing. The methodology used for reviewing information could be described as an IDM. The use of the IFC schema and/or IDMs could also support the partial automation of this activity through the establishment of rule-based checking. Such rules could test information against the relevant MVDs.

ISO 19650-2 clause 5.7 Information Model Delivery

5.7.2 Review and authorize the information model and

5.7.4 Review and accept the information model. The methodology used for reviewing information models could be described as an IDM. The use of the IFC schema and/ or IDMs could also support the partial automation of this activity through the establishment of rule-based checking. Such rules could test information against the relevant MVDs.

1.5 Conclusion

To realize the value of open data, it should be used in a manner that supports organizational activities. The UK has demonstrated its ability to generate economic value by using open data. Within the built environment, the development of the UK BIM Framework is underpinned by an expectation of utilizing open data. The application of open data to support the whole life of an asset in the built environment can be achieved through the use of buildingSMART solutions. These can directly support activities specified within the ISO 19650 series.

When looking at how an organization plans to remain resilient and innovative, it is important to keep both minds and data open.

2.0 Summary

ISO 19650 guidance B has provided further insight into open data and buildingSMART.

It should be referred to by practitioners and those implementing the ISO 19650 series across a project, within an appointment or within an organization.

Please note that the ISO 19650 series is still new, albeit based on former UK standards. As experience of implementing the ISO 19650 series is gained over the coming months and years, this guidance will be updated to reflect both this experience and any comments/feedback received from users. It will also be updated to include guidance about COBie.

Please do let us have your feedback by emailing us at guidancefeedback@ukbimframework.org.

Please also remember that standards within the ISO 19650 series are available at www.bsigroup.com

Visit www.ukbimframework.org to see how the ISO 19650 standards plus other standards within the UK BIM Framework map to the design, build, operate and integrate process.

https://embed.notionlytics.com/wt/ZXlKd1lXZGxTV1FpT2lJeU1EWmxZV0l4TkRnNE5qWTBZVFZrWW1JeVpqTTFaREl5TV RSbFpTmpaaUlzSW5kmNtdHpjR0ZqWlZSeVlXTnJaWEpKWkNNJNkltMU1ha0ZXVtGd04zZE5iemhzTjBoMk1IRXpKbjA9