

Little Book of BIM

2019 edition

Includes ISO 19650 Standards

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Welcome to the **BSI Little Book of BIM**

This handy guide is your quick reference to some of the key definitions which are commonly used in describing BIM and its related processes, as well as your link to the key Standards.

If you're already operating using BIM, these terms will be familiar.

This guide can be used by organizations across the supply chain.

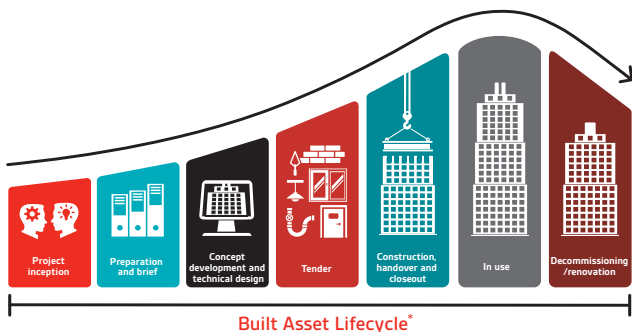
BIM and its adoption globally continues to gather pace. With the new international BIM Standards ISO 19650 parts 1 and 2 joining the BIM Standards family, ensuring you understand the principles of BIM is vital.

Contents

BIM Definition	3
<hr/>	
Key Standards for BIM	4
<hr/>	
BIM Guiding Principles	7
<hr/>	
Acronyms and Definitions	10
<hr/>	
BIM Maturity	18
<hr/>	
BSI BIM Journey	19
<hr/>	
BSI BIM Solutions	21
<hr/>	
Why BSI?	28
<hr/>	
BSI BIM Enquiries	29
<hr/>	

BIM Definition

Building Information Modelling (BIM) is a collaborative way of working underpinned by digital technologies, which allow for more efficient methods of designing, delivering and maintaining physical built assets throughout their entire lifecycle. Greater efficiencies can be realized due to significant pre-planning during the design and construction phases, providing comprehensive information at handover stage.



* This asset lifecycle concept is based on the RIBA Plan of Work 2013

Key Standards for BIM

ISO 19650-1:2018 – Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling. Concepts and principles. This will supersede BS 1192:2007+A2:2016.

ISO 19650-2:2018 – Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling. Delivery phase of the assets. This will supersede PAS 1192-2:2013.

PD 19650-0:2019 – Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM). Guide to ISO 19650:2018.

PAS 1192-3:2014 – Specification for information management for the operational phase of assets using building information modelling.

BS 1192-4:2014 – Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure). Collaborative production of information. Fulfilling employer's information exchange requirements using COBie. Code of practice.

PAS 1192-5:2015 – Specification for security-minded building information modelling, digital built environments and smart asset management.

PAS 1192-6:2018 – Specification for collaborative sharing and use of structured Health and Safety information using BIM.

BS 8536-1:2015 – Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure).

BS 8536-2:2016 – Briefing for design and construction. Code of practice for asset management (Linear and geographical infrastructure).

BS 8541-1:2012 – Library objects for architecture, engineering and construction. Identification and classification. Code of practice.

BS 8541-3:2012 – Library objects for architecture, engineering and construction. Shape and measurement. Code of practice.

BS 8541-4:2012 – Library objects for architecture, engineering and construction. Attributes for specification and assessment. Code of practice.

To discover all the BIM Standards available, visit bim-level2.org/en/standards

Supporting Standards

BS ISO 44001:2017 – Collaborative business relationship management systems. Requirements and framework.

ISO 9001:2015 – Quality management systems. Requirements.

ISO 55001:2014 – Asset management. Management systems. Requirements.

ISO/IEC/27001:2017 – Information technology. Security techniques. Information security management systems. Requirements.

BS ISO 10004:2018 – Quality management. Customer satisfaction. Guidelines for monitoring and measuring.

BIM Guiding Principles

BIM has introduced some new principles in how assets should be designed, built and managed in order to best realize the potential benefits offered by this new way of working.

People, process and technology

BIM is not just a technology; it's a new way of designing, constructing and managing assets enabled by the use of technology. Equally, if not more fundamental than technology, is the set of processes that should be followed (outlined within the ISO 19650 and BS/PAS 1192 series of Standards) as well as the change in working practices at an operations level. This is best exemplified by the need for a collaborative approach across the supply chain.

Collaborative engagement

One of the key parameters in how successful a BIM project has been delivered is the degree to which the supply chain has worked in collaboration to meet the project/asset needs. This means working openly and sharing information and experience with supply chain

members in a way that encourages collective problem solving and coordination.

Start with the end in mind

A key problem that BIM addresses is the legacy issue of rushed decisions being made late in the day, supported by insufficient and incorrect information. Starting with the end in mind, these decisions are pushed “up-stream” so that they are better informed and do not present themselves unexpectedly. Examples of this include; completing all principle design work and coordination before the commencement of construction, and ensuring that design decisions are being made across the entire delivery phase with respect to the operational performance and utilization of the asset (BS 8536).

Digital asset

It's becoming increasingly recognized that monetary value is not solely attributed to the physical asset, but also attributed to the “digital twin” of that asset. I.e. the collective sum of all data/information describing graphical and non-graphical characteristics and required by the physical asset. Knowing that this digital

asset accurately represents the physical asset; design, construction and operating decisions can be optimized.

Holistic approach to security

Once it has been identified what needs to be protected and the threats and consequences associated to this, in order to ensure the security of a sensitive built asset and sensitive information, a holistic approach should be adopted covering people, process, technological security and physical security.



Acronyms and Definitions

There are many terms which form part of the BIM language. Whilst not exhaustive, here are some of the common ones to look out for.

CDE Common Data Environment

The single source of information for any given project or asset, used to collect, manage and disseminate all relevant approved project/asset information. Stored digitally, this is where information is shared collaboratively in a logical and accessible way to help all key parties readily gain access to information, using universal naming conventions, avoiding duplication and retaining ownership.

Status Code

This is a meta-data field within the CDE which is used to describe the suitability of the information to which the status code is assigned. The status code identifies the permitted use of the information and can be used to help facilitate specific workflows within the project's/asset's CDE.

OIR Organization Information Requirements

This defines what information is required to achieve an organization's strategic objectives in relation to business operation, asset management, portfolio planning etc. The OIR may be developed from an ISO 55001 asset management system.

AIR Asset Information Requirements

This defines the information that is needed, and the managerial and technical aspects of producing this information, for the operational phase of an asset's lifecycle and to answer the OIR. It is equivalent to the EIR (below) which defines the information needed for the design and contraction phase of the lifecycle.

EIR Exchange Information Requirements

This is the document which determines the appointing party's information requirements in relation to an appointment (contract). It identifies what the appointing party expects to be delivered during both the delivery and handover. It includes responsibility, timescales, format and level of information need of the project information. It also includes any other project-specific requirements, such as procedures to be adopted, the plan of work to be used, any format restrictions and

should consider (amongst other things) the Project's information Standard, OIR and AIR respectively.

PIR Project's Information Requirements

For a given project milestone, this defines what information the appointing party of a project needs from the delivery team. This informs them as to whether a key project milestone has been met.

Level of Information Need

Described within the OIR, PIR, AIR and EIR, the level of information need defines the granularity of both graphical and non-graphical information of an information deliverable. This should be defined as the minimum granularity to avoid over-production of information leading to waste and so consideration should be made on the purpose of any produced information.

BEP BIM Execution Plan

Broken up into pre and post-appointment outputs, this document defines how the project's information management will be carried out by the delivery team relating directly to the project's EIR. It includes, amongst other things, who is responsible for providing

information, what the processes will be, and provides common terminology to be adopted as well as job titles and responsibilities within the delivery team.

Delivery Team's Mobilization Plan

This details the approach, timescales and responsibilities for the delivery team to be implemented during mobilization. This includes testing information exchanges between task teams and testing the proposed information production methods and procedures.

MIDP Master Information Delivery Plan

Developed from the BIM Execution plan, this forms part of the (post-contract) BEP and is the primary plan for when information is going to be prepared, by whom and when. It also sets out the format and the timescales.

Each information deliverable will be aligned to a defined project delivery milestone and so the MIDP serves as a tool to define information delivery throughout the project.

TIDP Task Information Delivery Plan

Task Information Delivery Plans are produced for/by each task team from their viewpoint. They are collated

into the Master Information Delivery Plan and are based on the deliverables as agreed within their contract.

Project's Information Standard

This details specific information Standards required by the appointing party. It establishes requirements on the exchange of information, the structuring and classification of information, assignment of level of information need and use of information in the operational phase of the asset.

Delivery Team's Risk Register

This details the delivery team's risk associated with the timely delivery of information deliverables in accordance with the appointing party's EIR. Considered risks include (amongst others), meeting the information delivery milestones and adoption of the project's information Standard.

PIM Project Information Model

This is the term for the information (graphical, non-graphical, documentation) which is developed during the design/construction phase of the project. Information that forms the PIM is created by the project team and sits within the CDE. As the project develops

so too will the PIM, which will increase in both size and accuracy; starting as a design intent model progressing to an as-built model after construction is complete.

COBie Construction Operation Building Information Exchange

A spreadsheet data format that contains digital information about maintainable assets in as complete and as useful a form as possible. This spreadsheet has a pre-defined structure that is used to both store and index information transferred within the CDE.

A COBie file contains only information that is needed and is stored in such a way that the recipient knows exactly where to find any given information (allowing automation of this process).

AIM Asset Information Model

All the information that is needed to support the management and operation of the built asset (infrastructure or building). This can be formed partly from the PIM at the handover stage of a project. It differs from the PIM in that it consists only of the information that is needed to support the management and operation of the asset. The AIM will continually be updated and developed throughout the life of the asset

as information is fed into the model during the asset's management.

BASS Built Asset Security Strategy

The Built Asset Security Strategy should be developed for the lifecycle of a given built asset and should determine the relevant security requirements and associated risks as well as the strategy to mitigate these risks through a Built Asset Risk Management Plan. This should inform any OIRs (PAS 1192-3) and/or project's information requirements developed.

BASMP Built Asset Security Management Plan

Following on from the BASS, the Built Asset Security Management Plan should be developed which identifies how a holistic approach is to be implemented in practice against the specific security risks, or combinations of risks, identified within the BASS.

SB/IMP Security Breach/Incident Strategy

The Security Breach/Incident Management Plan forms part of the BASMP and should provide detail on how and the impact of failure and/or disruption is minimized ensuring business continuity is maintained and the security is upheld.

BASIR Built Asset Security Information Requirements

Following on from the BASMP, the Built Asset Security Information Requirements shall be defined which identifies what specific information is needed to be produced and managed in order to meet the holistic approach defined within the BASMP. Details on the requirements on how information for a specific built asset should be generated, stored, disseminated and used should also be outlined. This should inform any AIRs (ISO 19650/PAS 1192-3) and/or EIRs (ISO 19650-2) developed.

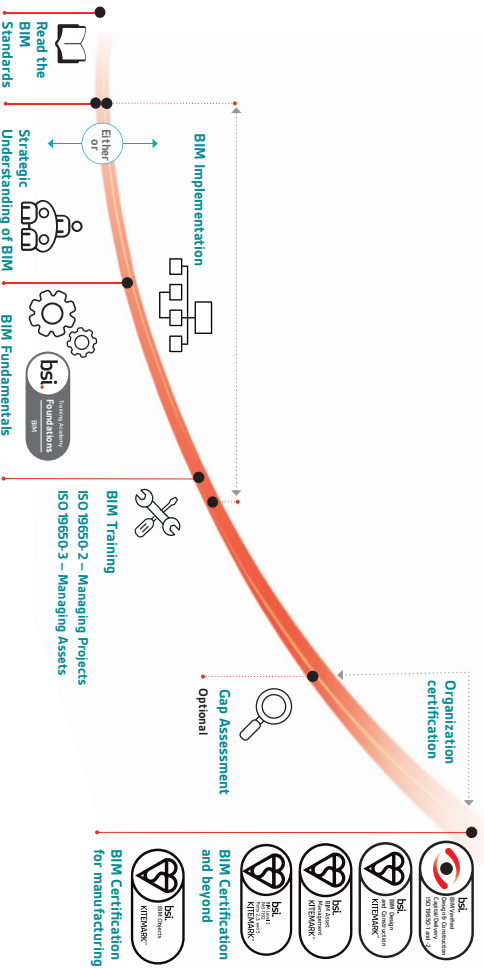
BIM Maturity

The UK Government originally defined four BIM maturity Levels which essentially define the journey, for the production and management of information from a siloed and two-dimensional approach to a fully digital environment encouraging true collaboration.

Since April 2016 the UK Government have introduced a condition of contract requiring that all Government commissioned construction projects will require "BIM Level 2" competence. Other nations have also introduced, or are planning to introduce, similar requirements.

With the publication of the new ISO 19650, parts 1 and 2, BIM will now move to having an internationally agreed definition and maturity. 'BIM according to ISO 19650' defines the minimum requirements and gives further recommendations to applying best practice to BIM. In the near future more of the PAS 1192 BIM Standards will be superseded by International Standards, further creating a common approach to BIM, across the entire lifecycle of the asset.

BSI BIM Journey



Proven success of adopting the BSI Kitemark™



say the BSI Kitemark had **increased sales**



experienced improved **internal business confidence** with the BSI Kitemark



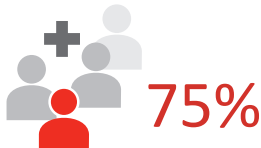
see an improvement in their **business reputation**



see an increase in the **efficiency of their processes** with the BSI Kitemark



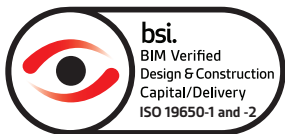
say the BSI Kitemark helped them to **improve customer satisfaction**



say the BSI Kitemark certification had helped them **attract new customers**

BSI BIM Solutions

BIM Verification for Design and Construction



Based on ISO 19650 (Parts 1 and 2), this has been developed for any organization involved

in using BIM. It will help you demonstrate your BIM capability through independent and impartial third-party verification.

BSI Kitemark™ for Design and Construction



Developed for any project team organization, the BSI Kitemark will provide the most robust

measurement of a company's delivery of BIM projects, certifying businesses for their diligence in design and construction, supply chain management and delivery of customer service excellence. As with other BSI

Kitemarks, organizations holding the BSI Kitemark will be routinely assessed, providing clients with complete confidence in their delivery to industry Standards.

“The BSI Kitemark is a respected brand. Applied to our services it will reinforce client confidence and prove greater quality in the delivery of BIM projects.”

David Throssell,

BIM and Digital Engineering Operations Manager, Skanska UK

The BSI Kitemark for Design and Construction builds on BIM Verification for Design and Construction. It involves sampling of past, on-going and completed projects and assessment of customer satisfaction (through ISO 10004 Customer Satisfaction Guidelines for monitoring and measuring). It also uses additional assessment parameters through BS ISO 44001 Collaborative Business Relationships and builds on specific requirements from ISO 9001, Quality management systems.

BSI Kitemark for BIM Asset Management



The BSI Kitemark for BIM Asset Management provides assurance that asset and facilities managers have integrated BIM into their asset management processes and confirms that asset information is accurate and up-to-date. We assess evidence of controlled documented procedures for all processes against the assessment Standard PAS 1192-3, plus the delivery of assets to appointment requirements, measurement and monitoring of customer satisfaction, effective management of the supply chain and quality management (ISO 9001).



“We are able to apply consistent standards and processes across the group for managing data and information over the lifecycle of assets. It helps build up the capability of our colleagues which will improve the quality of delivery and make the process efficient. The BSI Kitemark will ultimately improve the way we manage assets for our clients and ultimately for the society.”

Navil Shetty,

Director of Asset Management, Atkins Ltd

BSI Kitemark for BIM Level 2



The BSI Kitemark for BIM Level 2 builds on the above two BIM Kitemarks but also includes assessment

of how an organization is embedding security principles in alignment with PAS 1192-5 Specification for security minded building information modelling. This assessment will look into how you approach security with respect to physical systems, technological

systems, personnel awareness/adoption of security, and organizational security processes.

With security becoming an ever-more important factor for business continuity, ensuring that your organization is adopting an appropriate and proportionate security-minded approach is vital and BSI Kitemark can help this be achieved.

BSI Kitemark for BIM Objects



The BSI Kitemark for BIM Objects is the benchmark in best practice for the production of digital

products used in BIM models. Designed to prove manufacturers have embedded BIM within their product manufacturing processes, it covers the full range of construction products for structural, architectural and mechanical, electrical and plumbing. The Kitemark certification process ensures that your BIM Objects are a true likeness of your physical products, to give your customers complete confidence during design, construction and asset management.

The assessment standard is BS 8541 – Library objects for architecture, engineering and construction:

Part 1 – Identification and classification

Part 3 – Shape and measurement

Part 4 – Attributes for specification and assessment

We've also developed an additional set of requirements for the BSI Kitemark that build on these Standards and are based on industry feedback to help ensure your BIM content is of the highest quality.

“Our business uses BIM standards throughout the lifecycle to ensure consistency in our digital approach. It puts our clients in a much better position when leveraging technology in the management of their assets. It helps us mitigate and manage risk, adds value and ultimately enables us to deliver better quality and a much shorter timeframe.”

Scott McGee,

Information Management Lead, CIMIC Group

Training

Developed in conjunction with leading industry consultants and trends, our BIM training courses provide the most relevant and up-to-date information in the market. You'll learn how to effectively manage information across all stages of your construction projects.

Wherever you are on your journey, whatever your role, we have a course to help you be more efficient at what you do.

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Why BSI?



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- Our Credo "**Making Excellence a Habit**" keeps BSI **client focused, valued and appreciated** by our clients
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From tram tracks to the Internet of Things, our heritage is closely tied to how 'things' work. Making sure they work safely. Making sure they work properly.

Over one hundred years ago, our first standard reduced the number of tram track gauges from 75 down to 5. Today we now offer over 58,000 standards and we originated the world's 3 most widely adopted standards: quality management, environmental management and occupational health and safety.

We also help organizations all over the world implement this collective best practice, training 134,000 delegates and spending 191,000 days evaluating and certifying management systems each year.

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