Little book of BIM

2018 edition

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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.

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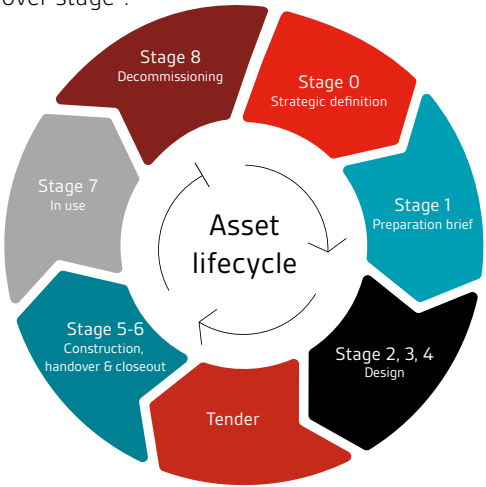
BIM definition

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 realised 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

BS 1192:2007+A2:2016 – Collaborative production of architectural, engineering and construction information. Code of practice.

PAS 1192-2:2013 – Specification for information management for the capital/delivery phase of construction projects using Building Information Modelling. Pioneering the BIM Standard.

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 1192-6:2015 – Specification for collaborative sharing and use of structured hazard and risk information for Health and Safety.

BS 8536-1:2016 – Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure).

BS 8536-2 – 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 bimlevel2.org

BS 11000-1:2010 – Collaborative business relationships. A framework specification.

ISO 9001:2015 – Quality management systems. Requirements.

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

ISO/IEC/27001:2013 – Information Technology. Security techniques. Information Security Management system requirements.

BS ISO 10004:2012 – Quality management. Customer satisfaction. Guidelines for monitoring and measuring.

BIM guiding principles

BIM Level 2 has introduced some new principles in how assets should be designed, built and managed in order to best realise the potential benefits offered by this new way of working.

People, process and technology

BIM is not just a technology; it is 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 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 gathering all information required for the management of the asset facilitating the handover phase (Soft Landings).

Digital asset

It is becoming increasingly recognised 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 and required by the physical asset. Knowing that this digital asset accurately represents the physical asset; design, construction and operating decisions can be optimised.

Holistic approach to security

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

BIM image courtesy of Skanska UK Ltd.

Acronyms and definitions

There are many terms which are 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, used to collect, manage and disseminate all relevant approved project information. Stored digitally, this is where information is shared collaboratively in a logical, accessible way to help all key parties gain access to information. **This means that, firstly, information is readily accessible (using universal naming conventions) and is not duplicated, and secondly, information has both a defined purpose and owner.**

SMP Standard Methods and Procedures

This defines the rules of how the information within the CDE is managed, for example, naming conventions and status codes adopted in the project.

LOD Level of Detail

The Level of Detail defines the amount of graphical information a model contains.

LOI Level of Information

This describes the amount of non-graphical information a model contains.

EIR Employers Information Requirements

This is the document which determines what the client (the 'Employer') wants from the project, as delivered by the project team. It identifies what the client would expect to be delivered during both the delivery and handover phases including responsibility, timescales, format and level of detail of the delivery of such information. It also includes any other project-specific requirements such procedures to be adopted, the plan of work to be used or any format restrictions.

PLQs Plain Language Questions

Questions asked of the supply chain by the employer to inform decision-making at key stages of an asset lifecycle or project.

BEP BIM Execution Plan

Broken up into pre and post-contract outputs, this document defines how the project will be carried out relates directly to the 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.

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. This is developed from the BIM Execution Plan.

Each information deliverable will be aligned to a defined project stage 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 supply chain member from their viewpoint. They are collated into the Master Information Delivery Plan and are based on the deliverables as agreed within their contract.

PIP Project Implementation Plan

This forms part of the BEP and is a series of documents used to prove the supply chain's overall capability to deliver the project, as defined by the EIR. This includes

a supply chain member's current BIM knowledge and experience as well as the capability of both their IT and human resource. This will lead to an overall picture of the entire project team's BIM capability.

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).

OIR Organization Information Requirements

This defines what data/information is required to achieve an organization's strategic objectives. The OIR may be developed from an ISO 55001, Asset management system.

AIR Asset Information Requirements

This defines all of the data/information that is needed to manage the in-use phase of an asset's lifecycle. It is equivalent to the EIR which defines the information needed for the design and contraction phase of the lifecycle.

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 PLQs (PAS 1192-2) 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 Management Plan

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 minimised 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 (PAS 1192-3) and/or EIRs (PAS 1192-2) developed.

BIM Maturity

There are four levels of BIM maturity essentially which move the journey for the production of information from an individual, non sharing and two-dimensional approach to a fully digital environment encouraging true collaboration (BIM Level 3).

BIM Level 0	– 2D CAD drafting utilised – no collaboration.
BIM Level 1	– Mixture of 3D concept work and 2D for drafting of statutory approval documentation – Electronic sharing of data using a common data environment (CDE) – No collaboration between parties but data is shared.

BIM Level 2

- All parties use their own 3D CAD models, not necessarily working on a single, shared model
- Collaboration is used. Data is exchanged between parties and design information is shared in a single file format
- Federated BIM model is created. Each party can combine data with their own in order to make checks.

BIM Level 3

- Full collaboration between all disciplines by means of using a single, shared project model which is held in a centralized repository.

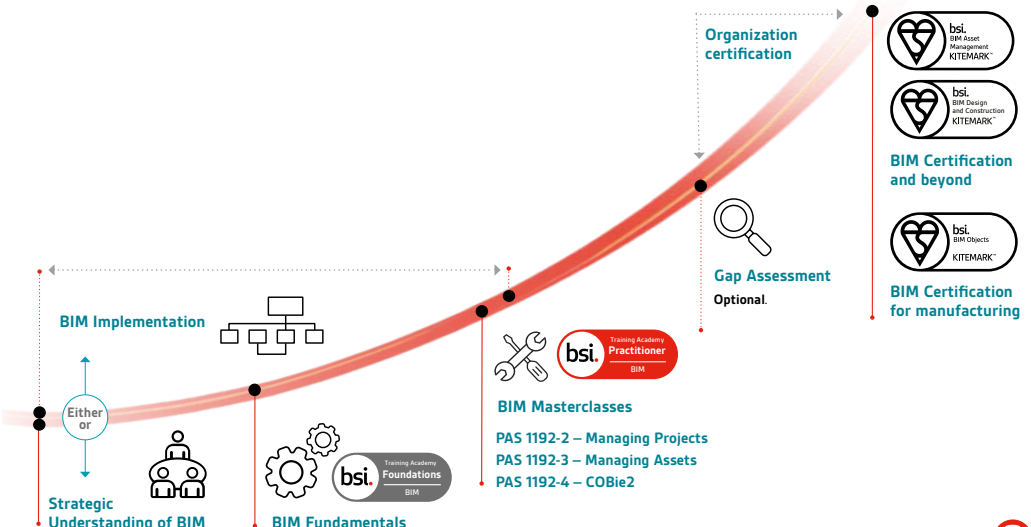
BIM Level 2

This is the UK Government condition of contract that since April 2016 all Government commissioned construction projects will require BIM Level 2 competence.

PAS 1192-2 and BS 1192:2007 are the standards that support the Construction BIM Strategy to achieve BIM Level 2 compliance and the desired reduction in CAPEX out turn cost. This means:

- All parties use their own object based 3D models, not necessarily working on a single, shared model
- Collaboration is used. Data is exchanged between parties and design information is shared in an interoperable format
- Federated BIM model is created. Each party can co-ordinate their models with those produced by other organizations to make checks.

BSI BIM Journey



Proven success of adopting the BSI Kitemark™

65%

say the BSI Kitemark had **increased sales**

60%

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

80%

see an improvement in their **business reputation**

70%

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

80%

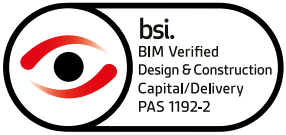
say the BSI Kitemark helped them to **improve customer satisfaction**

75%

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

BSI BIM Solutions

BIM Verification for Design and Construction



Based on PAS 1192-2:2013, this has been developed for any organization involved in using BIM to deliver new buildings or infrastructure projects. It will help you to demonstrate your BIM capability through independent and impartial third party verification.

BSI Kitemark™ for Design and Construction

Developed for both Tier 1 and non-Tier 1 organizations 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 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 11000 Collaborative Business Relationships and builds on specific requirements from ISO 9001, Quality management systems. Like the verification certification, the BSI Kitemark covers BIM Level 2 at the Design and Construction phase.

BSI Kitemark for BIM Asset Management

The BSI Kitemark for BIM Asset Management provides assurance that asset managers 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 contract requirements, measurement and monitoring of customer satisfaction, effective management of the supply chain and quality management (ISO 9001). ISO 9001 certification is a requirement for this certification.

"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 Objects

The BIM Objects Kitemark 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 setoff requirements for the Kitemark that buld on these standards and are based on industry feedback to help ensure your BIM content is of the highest quality.

"The BIM Object Kitemark demonstrates that Legrand has a robust set of processes in place for the production and management of BIM objects which is important as we continue on our digital journey"

Matt Crunden,
Training and BIM Manager, Legrand Electric

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.

All of our training courses are fully aligned to the Government's definition of BIM Level 2, so you can start delivering projects to meet requirements early. Wherever you are on your journey, whatever your role, we have a course to help you be more efficient at what you do.

Visit: bsigroup.com/training

We hope you have found the information here useful.

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Why BSI?

A global brand and network – trusted and recognized around the world

- A global network of over **4,000 people** supported by **10,000 industry experts**
- Over **100 years experience** across almost **every sector**
- Global specialization focused on **standards, training, certification and GRC**
- Industry specialized assessors **constantly trained** on new standards and processes
- Our Credo "**Making Excellence a Habit**" keeps BSI **client focused**, **valued and appreciated** by our clients
  – BSI assessors score 9.25/10 in our Global Client Satisfaction Index.

We are the business standards company that equips businesses with the right tools and solutions to turn best-practice standards into habits of excellence. With over 3,000 staff worldwide, we help our clients drive performance, manage risk and grow sustainably.

All our standards are underpinned by a collaborative and rigorous approach perfected over decades. We always work closely with industry experts, government bodies, trade associations, businesses of all sizes and consumers to develop standards that drive excellence.

Our reach is global and we play a key role within the International Organization for Standardization (ISO). As one of the founding members, we help make sure international standards developed address today and tomorrow's business and societal needs, while delivering real benefits to an organization and all its stakeholders.

To find out more
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