



Overcoming BIM implementation and compliance challenges

Kevin Wong

Head of Built Environment, BSI APAC



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- 
- 1. Introduction BSI**
 - 2. What is Standard ?**
 - 3. BIM compliance Challenges?**
 - 4. Overcoming by standardization**

British Standards Institution – The Beginnings

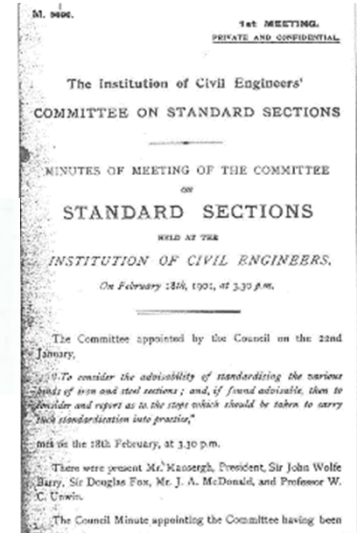


Sir John Wolfe Barry (1836-1918) achieved fame as the designer of London's Tower Bridge, but he was also one of the most prolific engineers of his age, with an extraordinarily wide range of activities.



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Perhaps his greatest contribution to the profession stemmed from his passion for standardisation. In 1901 he persuaded the Institution to establish a committee to consider the advisability of standardising various kinds of iron and steel sections. This led to the formation of the Engineering Standards Committee which Wolfe Barry chaired from 1905, and this later developed into the British Standards Institution (Chapter 3).

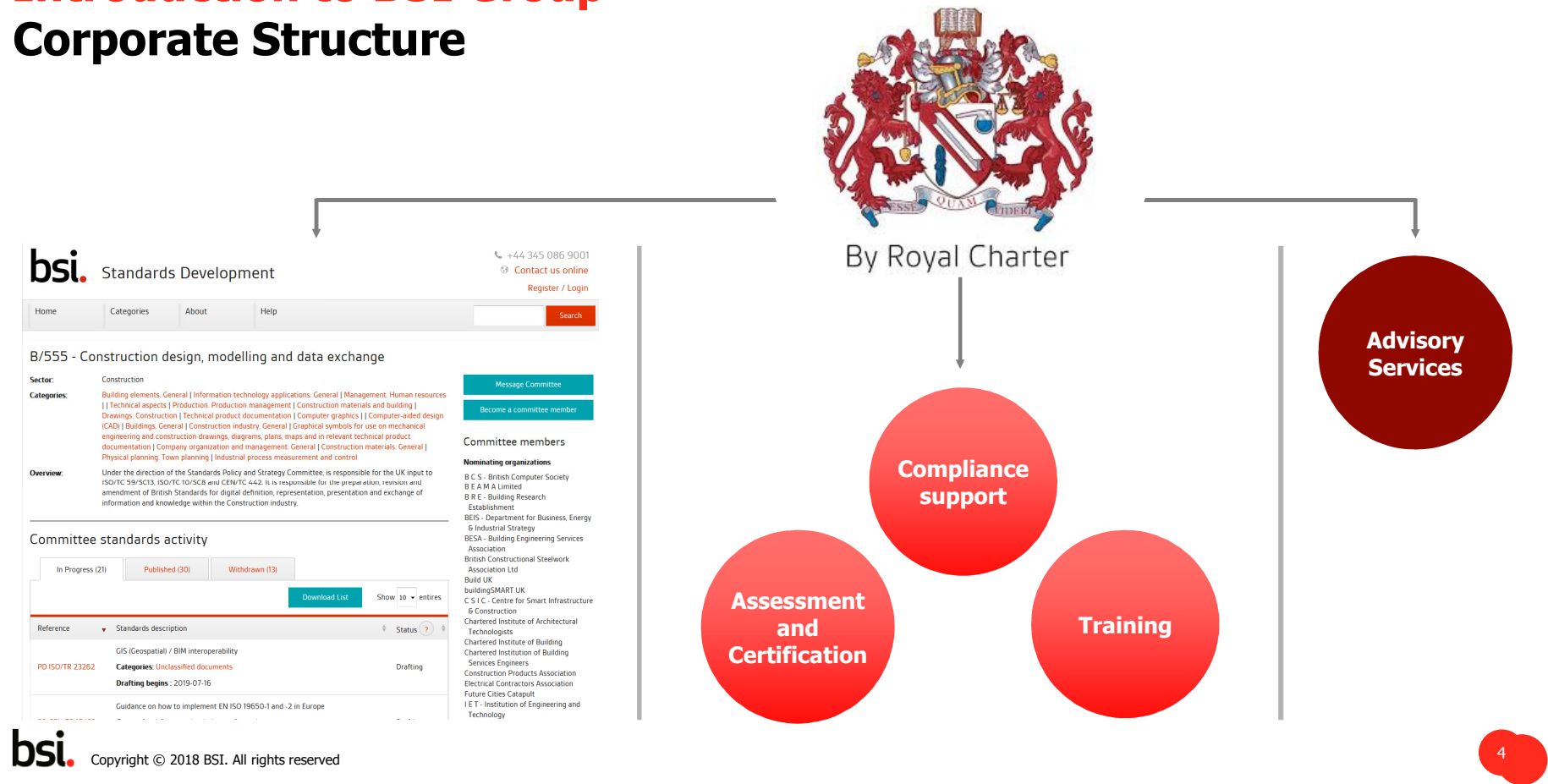


When it was first decided to take up the subject seriously in 1901 and to form the Engineering Standards Committee, certain fundamental principles were recognised as indispensable:

- That the different interests of producers and purchasers should be thoroughly represented;
- That the movement was a voluntary effort to introduce order into a condition of things which had become more or less chaotic;
- That the movement being voluntary, all should be asked to give their services gratuitously;
- That it should be recognised that, though a commencement would be made in two or three important matters, there would probably be many other subjects which would emerge as time went on;
- That the Committee should not take up subjects of their own initiation, but in order to meet recognised wants;
- That the Committee should not be merely an Academical Body, but one in the closest touch with the practical requirements of consumers and producers;
- That the Committee should not become a testing authority;
- Most important perhaps of all – that the work of the Committee should be subject at all times to revision.



Introduction to BSI Group Corporate Structure





Sir John Wolfe-Barry
founded BSI (designer
of London Tower Bridge)



BSI Kitemark®
released the first
national standard

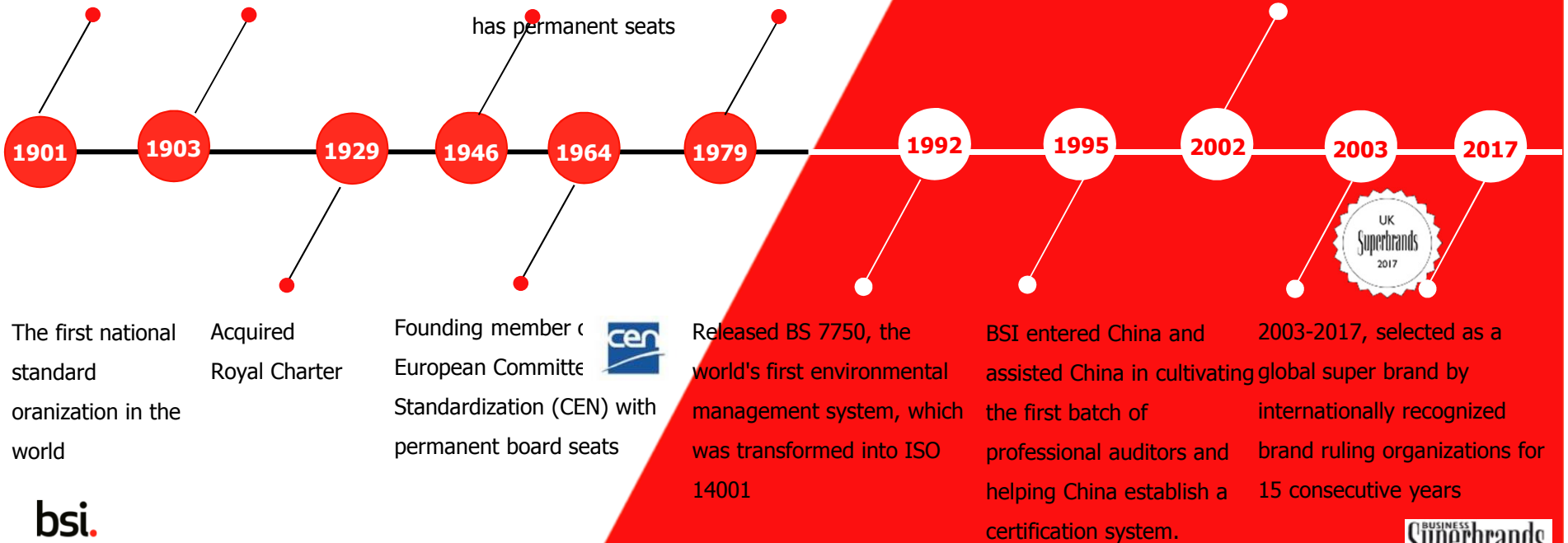


BSI is a founding member
of the International
Organization for
Standardization (ISO) and
has permanent seats



Released BS 5750 – Convert to
the widely used ISO 9001 quality
management system standard

Acquired KPMG's North American
Management System Certification and
became one of the largest certification
organizations in North America



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We are a successful global organization

4,600
colleagues
& **12,200**
experts

84,000
clients in
193
countries

Over **15,000**
active product
certifications

3,100
new standards
/year **63,000***
in all

232,000
audit days
delivered last
12 months

212,000
delegates
trained last 12
months

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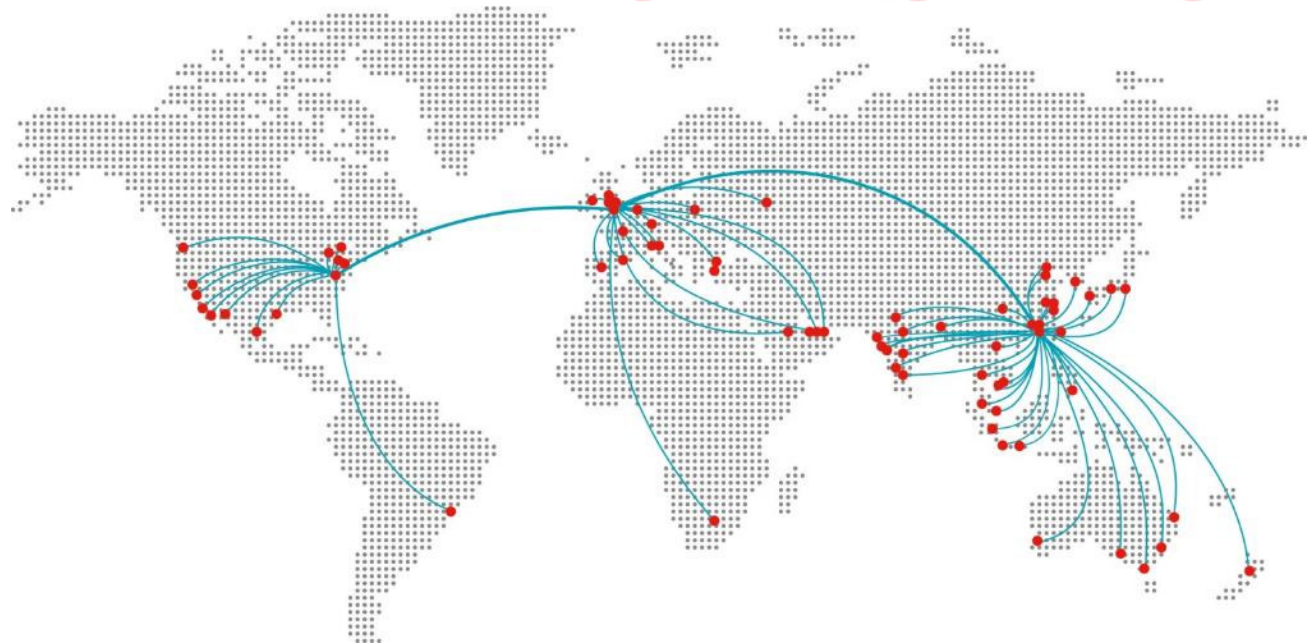
* Number of standards available on BSOL

BSI clients represent

50%
of Fortune
500

84%
of FTSE
100

81%
of Nikkei
Index



What do we do? BSI's end-to-end solutions





2. What is Standard ?

What is a Standard?

A standard is an **agreed way of doing something**, it could be making a product, managing a process or delivering a service. Standards define **best practice** and come in various forms. Their use is **voluntary**, but they provide many benefits. Standards can be applied to everything from construction, energy management and biodiversity to food and drink, IT security and road traffic safety”



Examples of where Standards “don’t work” vs “work”

						
North America Grounded NEMA 5-15	Japan Non-grounded JIS C 8303	Europe German style CEE7/4 Schuko	Europe French style Schuko	Europe/Russia Non-grounded CEE7/16 Europlug	Great Britain Grounded BS-1363	Great Britain "Shaver socket" BS-4573
						
Australia/China Grounded AS-3112	Italy Grounded CEI 23-16	Switzerland Grounded SEV-1011	Denmark Grounded SRAF 1962/DB	Israel Grounded SI 22 (IS 16A-R)	India Grounded BS-546 "Small"	South Africa Grounded BS-546 "Large"



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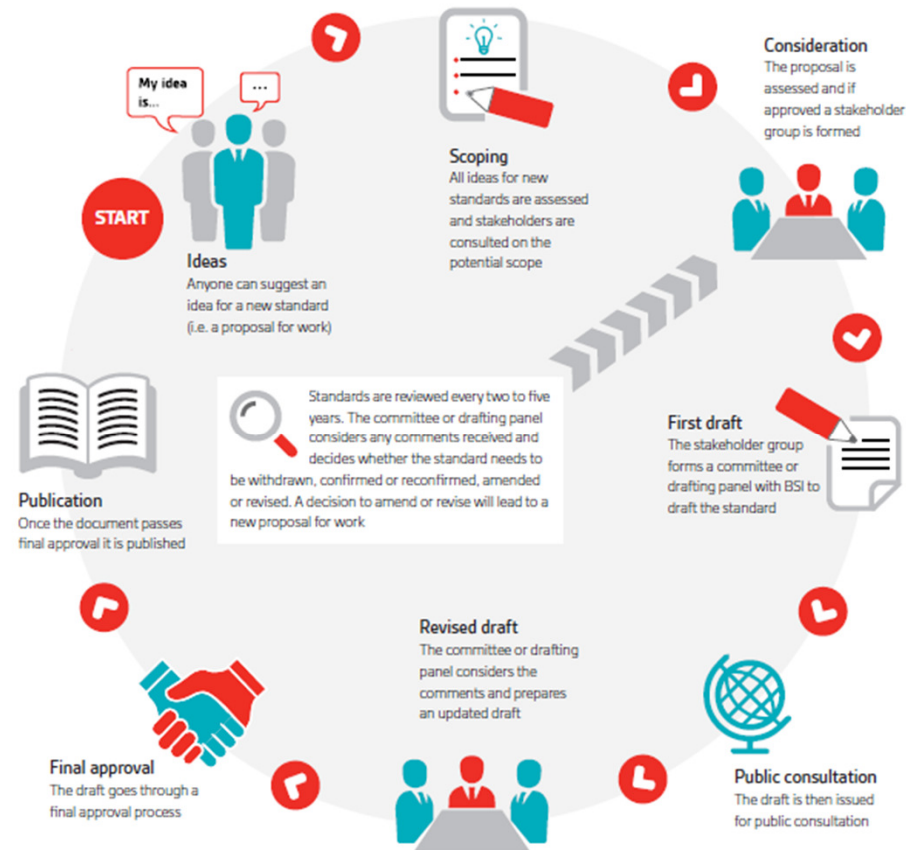
Lack of Standardization



**BS EN ISO/IEC 7810:2012 standard
Physical Characteristics of
Identification Cards**



BSI Standards Developing Cycle



BSI Standards – the UK's National Standards Body

BSI Standards in
NUMBERS

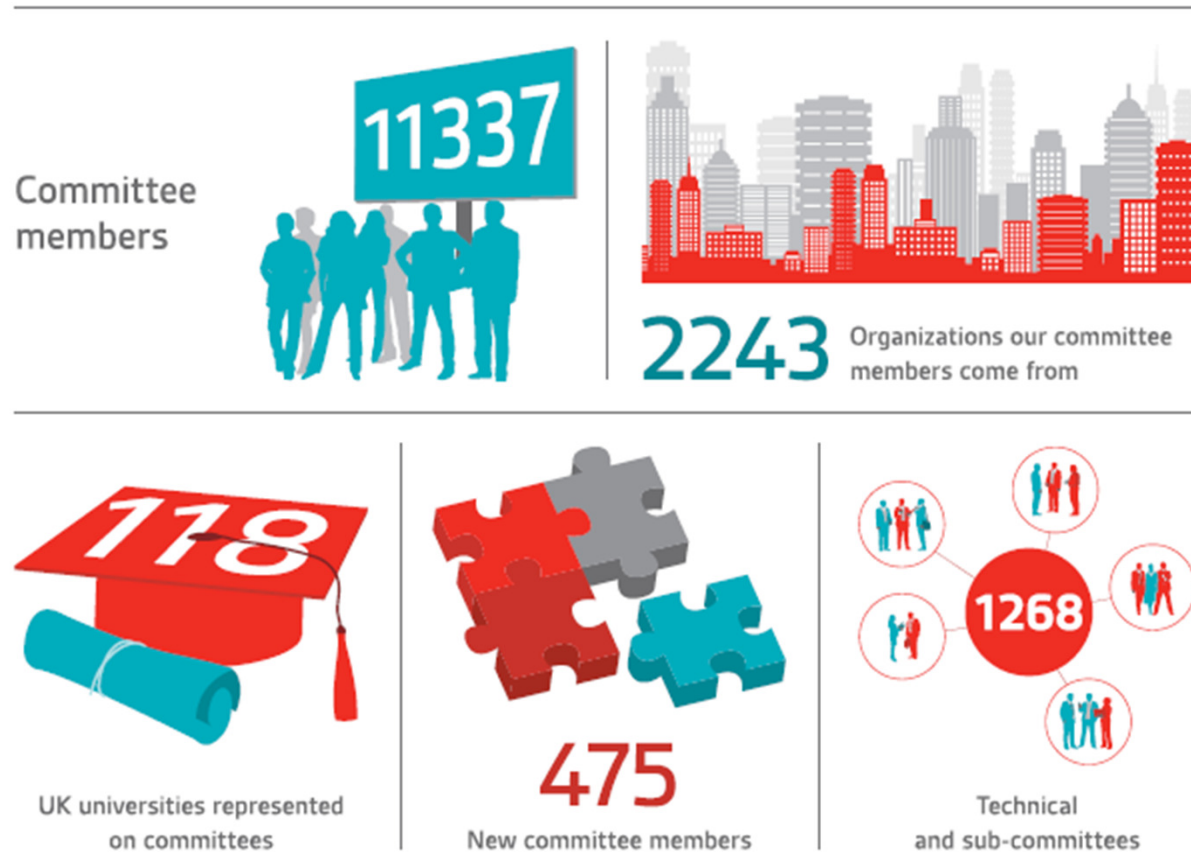


Origins of published standards
– **International** and **European** only
(excluding National)

European
14331
International
16750



BSI Standards – the UK's National Standards Body

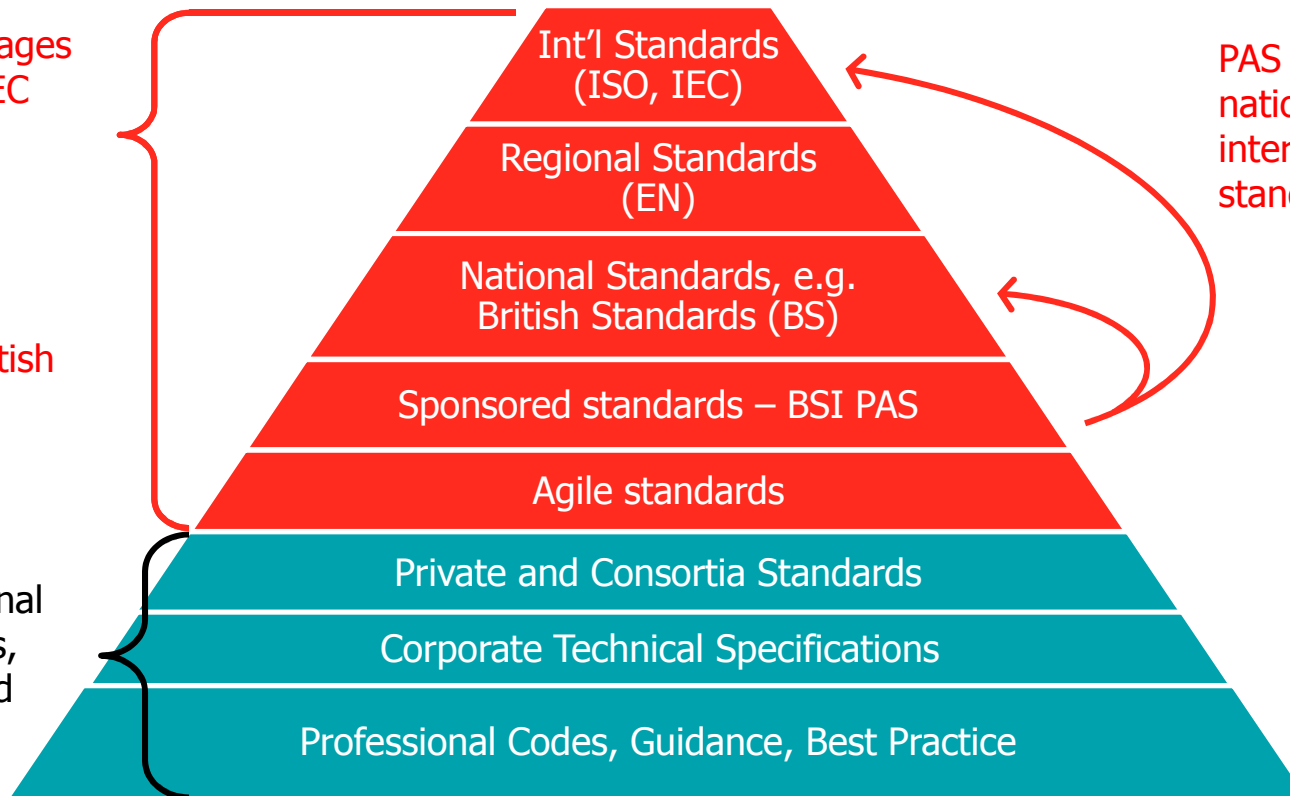


BSI National Standards Body – structure of standards in the UK

BSI as NSB manages
BS, EN & ISO, IEC
standards.

All EN and most
international
standards are
“adopted” as British
Standards

Private &
professional
standards,
codes and
guidance



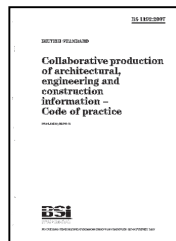
PAS route to
national and
international
standards



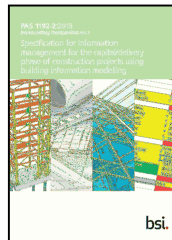
Introduction to ISO 19650

BIM International Standards

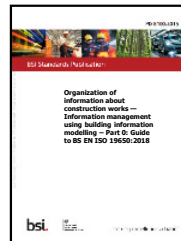
UK STANDARDS



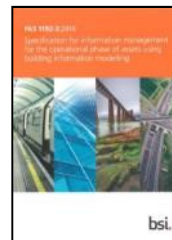
BS 1192:2007



PAS 1192-2



PD 19650-0
Guide to BS EN
ISO 19650



PAS 1192-3



BS 1192-4



PAS 1192-5



PAS 1192-6



BS 8536-1/-2

INTERNATIONAL STANDARDS



ISO 19650-1
2018



ISO 19650-2
2018



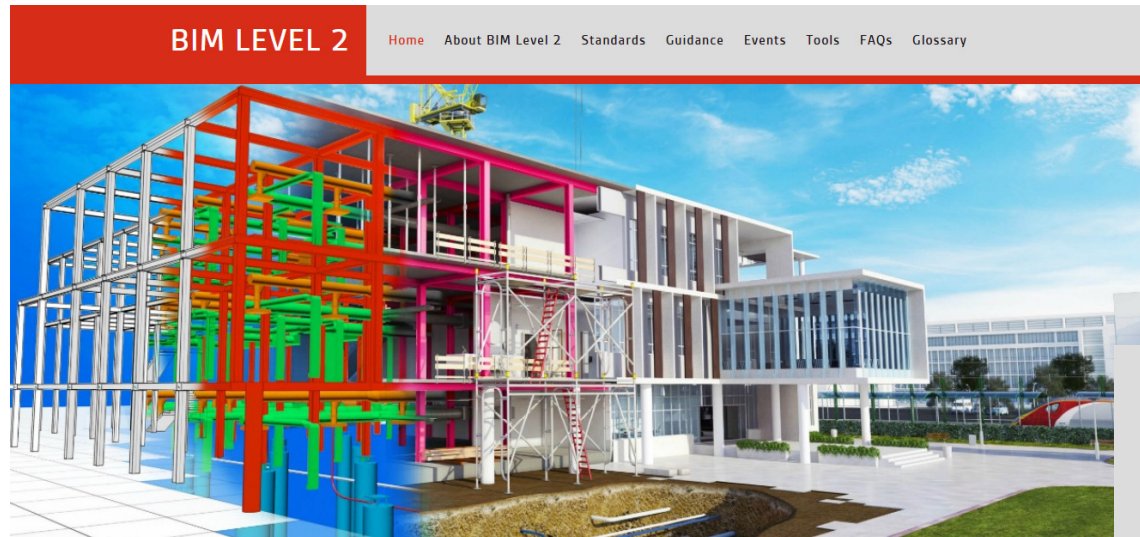
ISO 19650-3
2020 (TBC)



ISO 19650-5
2020 (TBC)



BSI BIM Level 2 webpage



Welcome to the BIM Level 2 website

We have developed this resource as a point of reference for clients, designers, contractors, trade suppliers, manufacturers, maintainers, operators and users to understand how to use Building Information Modelling (BIM) and data to improve productivity and reduce waste.

Work has been undertaken over the past four years in a joint Government – Industry Working Group called the BIM Task Group to provide Standards, Guides, Case Studies and shared experiences to help all stakeholders with their BIM adoption Journey.

Over the next six months you will see the final documents and materials developed from working with the standards. These will be



BROUGHT TO YOU BY

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The UK's national standards body & the business standards company providing services in knowledge, assurance and compliance.


Department for
Business, Energy
& Industrial Strategy

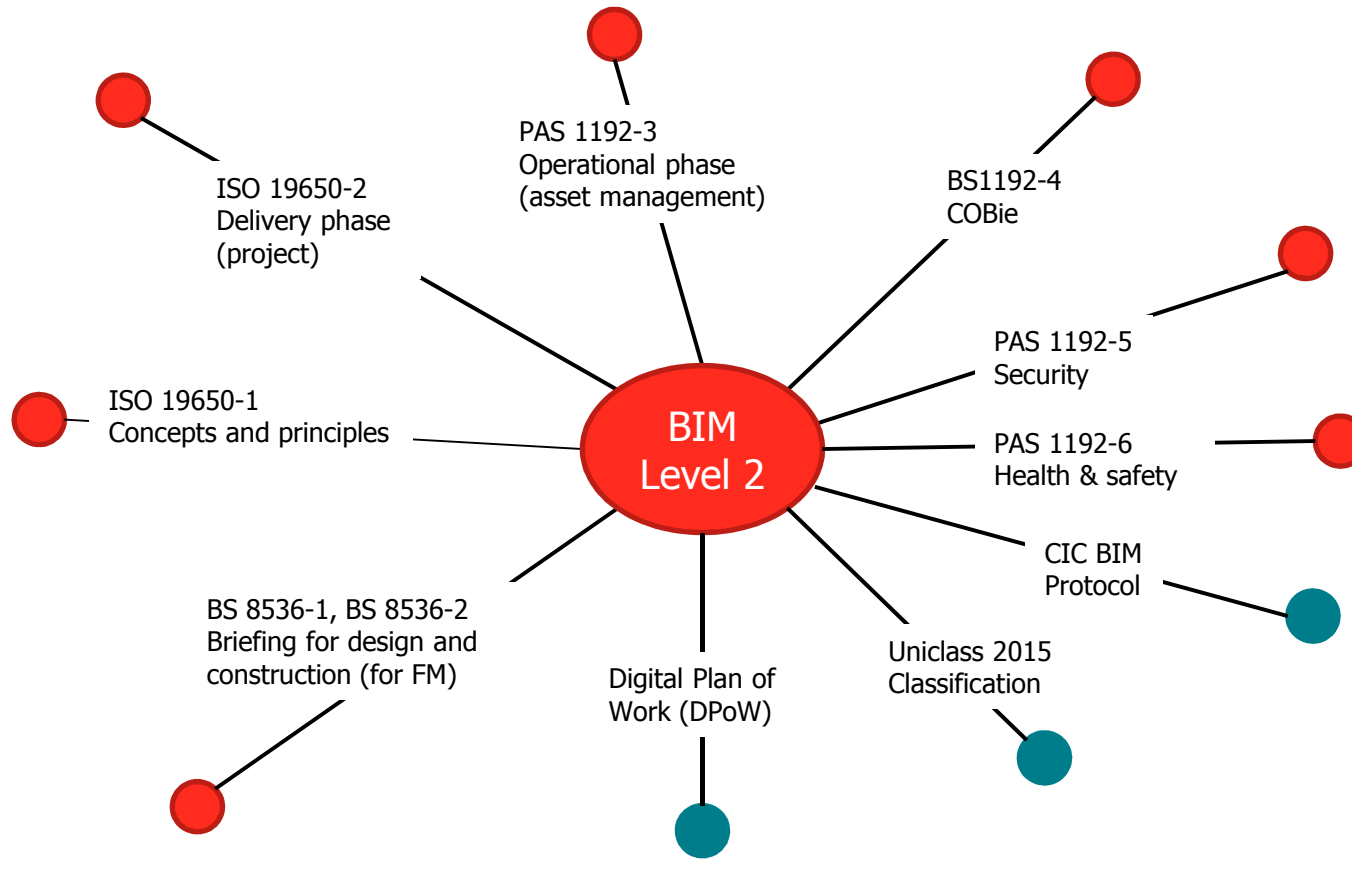
Task Group

The availability of this website has been made possible due to sponsorship from the Department of Business, Energy & Industrial Strategy and the Building Information Modelling (BIM)

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Standards supporting UK implementation of BIM

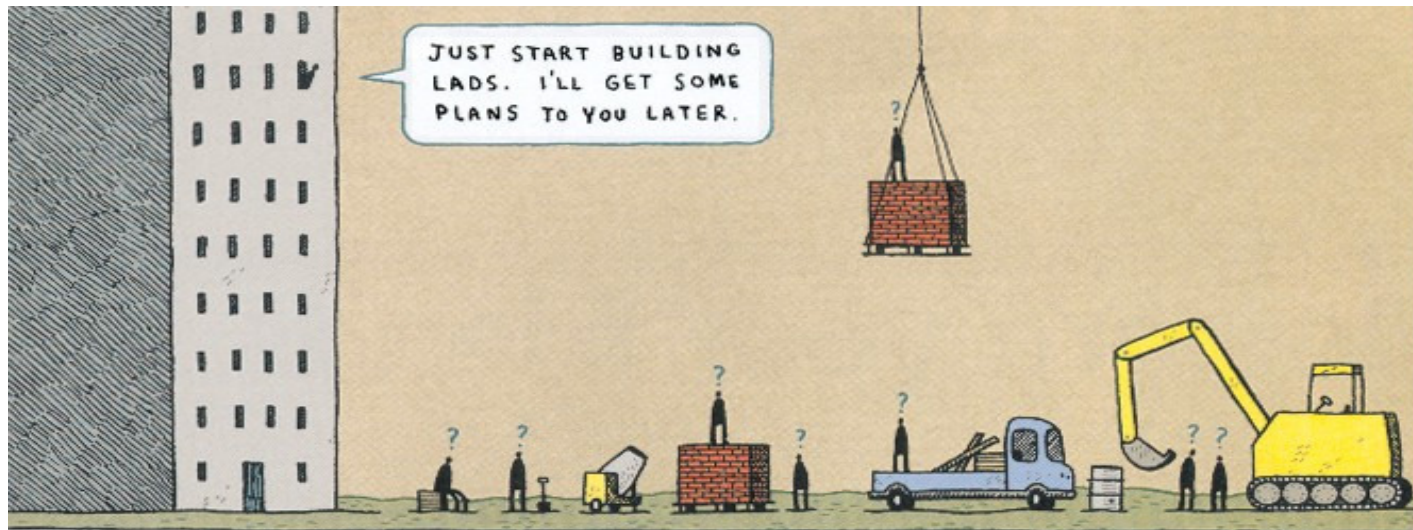




3. BIM compliance Challenges

Background: What's the problem?

Not that long ago it wasn't uncommon for new buildings to be **drawn 2.5 times**, and **constructed 1.5 times...**



= poor value, and poor productivity; and that's just the construction phase...



Digitalization in Construction – Are we on track?

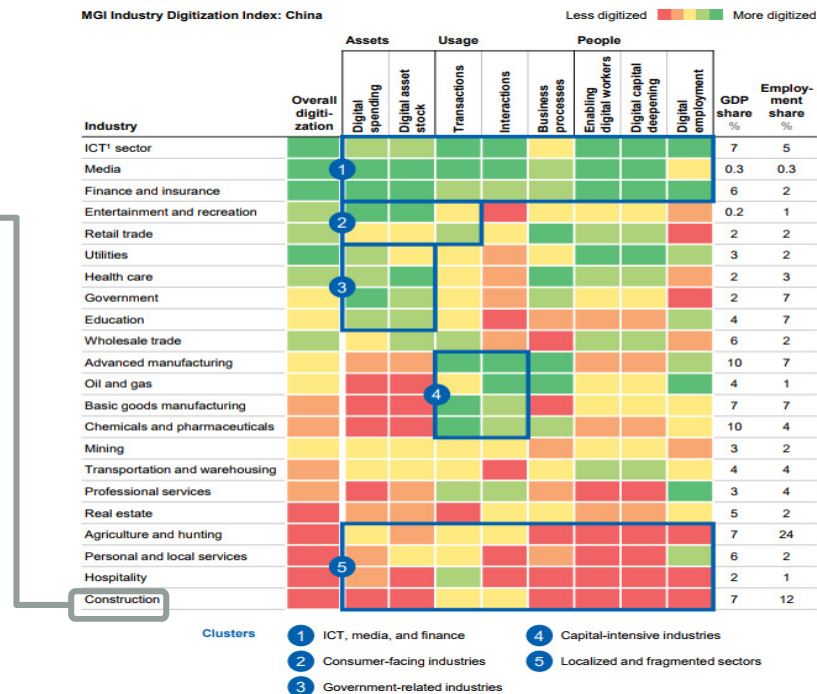
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HKURBAN
THE UNIVERSITY OF HONG KONG 香港大學
faculty of architecture 建築學院

Accredited by:



According to McKinsey's '2017 Digital China report' the digitalization level in construction is **the lowest** among all the other industries in China.

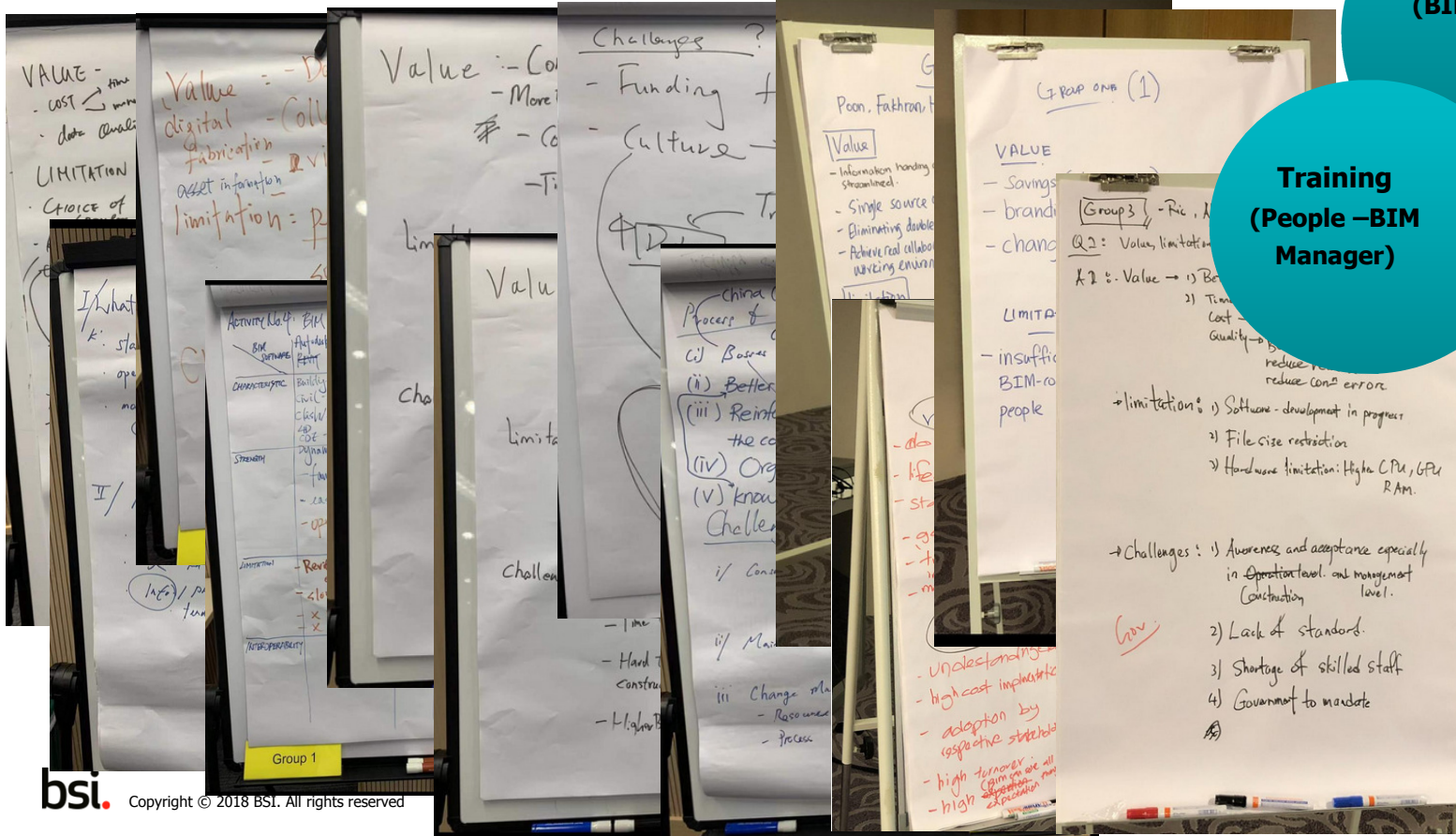


Take Hong Kong as an example, the core challenges



Project	Cost ²⁸		Timeline	
	Original APE	Revised APE	Original scheduled completion date ²⁷	Latest scheduled completion date
Hong Kong-Zhuhai-Macao Bridge	HK\$56.5bn	HK\$70.8bn	End of 2016	To be announced
Guangzhou-Shenzhen-Hong Kong Express Rail Link	HK\$69.6bn	HK\$89.2bn	2015	Sep 2018
Shatin to Central Link	HK\$79.8bn	HK\$80.7bn	2018-2020	2019-2021 ²⁸
Liantang/Heung Yuen Wai Boundary Control Point	HK\$26.7bn	HK\$35.4bn	End of 2018	End of 2018 ²⁹

What are the BIM Challenges ?



**Technology
(BIM Model/
CDE)**

**Training
(People -BIM
Manager)**

**Standard
(BIM Info.
Process
Management
and
requirement)**

Definition: What is BIM ?

"A digital representation of physical and functional characteristics of a facility creating a shared knowledge resource for information about it forming a reliable basis for decisions during its life cycle, from earliest conception to demolition."

Technology (BIM Model/ CDE)

**Training
(People –BIM Manager)**

Standard (BIM Info. Process Management and requirement)

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THE UNIVERSITY OF HONG KONG 香港大學
faculty of architecture 建築學院

Accredited by:

CONSTRUCTION
INDUSTRY COUNCIL
建造業議會

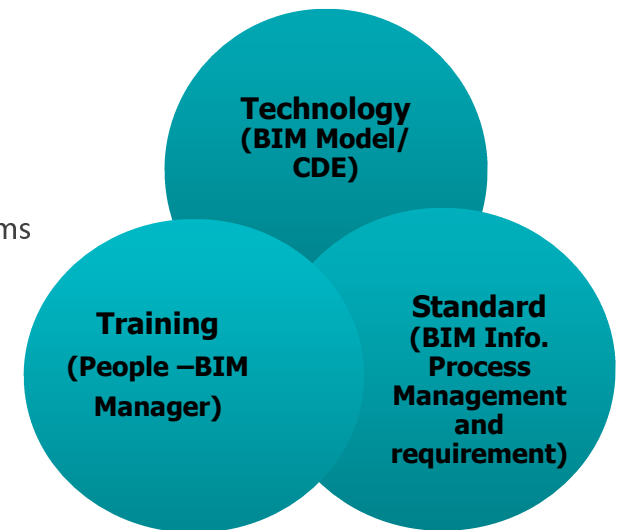
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What are the BIM Challenges?

Technology/ Training/ Standard/ Others/ All ?

- Naming – Building? Information Modeling? (**Standard**, vocabulary issue, acronyms we use, what is OIR AIR AIM MIDP BEP...etc, Standard, the Language for communication)
- People – Training (**Training**, experts needed per roles in standards PAS 1192-2 Table 2)
- Costing Saving in projects (**ROI/ All/ Training**, effective communication of BIM manager with stakeholders/ contracting)
- Choice of softwares – Revit, Naviscad, Fuzor, iTwo, Bentley...etc (**Technology**. Too many choice? how Standard can help to build your CDE?)
- Time vs Level of detail (**Standard**, helps with the requirements of LOD vs project stage, PAS 1192-2 Figure 20)
- Hard to catch up Real time of construction progress (**All**, CDE function in future, real time?)





4. Overcoming



4. Overcoming – Standards and Policy

Construction 2.0 - 3 Pillars



Pillar 1: Innovation

The vision: The development of an Industry culture that embraces change, innovation and new technologies to drive forward productivity, efficiency and enhanced project delivery outcomes.



Pillar 2: Professionalisation

The vision: Improved professionalism of the Industry through step change increases in project leadership, project management, procurement capabilities and professional skills and practices within Government and the private sector, to deliver higher quality construction and built assets, combined with a first priority focus on safety, construction supervision and quality in the workplace.



Pillar 3: Revitalisation

The vision: Reinvigorating the appeal and benefits of joining the Industry to attract and nurture growing numbers of young and energetic talent to the workforce and increasing the agility at the individual, organisational and Industry levels.



Innovation

- **MiC/DfMA** – set targets and measure the floor area completed of agreed projects.
- **Innovative procurement and contract forms** – set targets and measure the number of projects/contracts adopted.
- **Adoption of BIM technology** – uplift the utilisation rate of BIM technology.
- **Productivity** – establish indices to measure productivity across different sectors of the Industry.



Professionalisation

- **Professional development** – targets based around the number of professionals that complete agreed leadership, project management, technical training and development programmes.
- **Worker training output** – objectives based on the level of training hours completed by new and experienced workers in certain priority areas along with regular assessments of the volume and adequacy of those programmes.
- **Safety performance** – setting more stringent safety targets for the Industry.
- **Subcontractor management** – targets linked to increased levels of registered subcontractors.



Revitalisation

- **Attracting young talent** – targets based on the number of young talent that join and are retained by the workforce.
- **Nurturing young talent** – targets based on the number of mentorship schemes and training programmes offered to young talent.
- **Industry perceptions** – regular surveys directed at measuring public perceptions of the Industry.
- **Skilled workers** – targets focused on lowering the median age of skilled workers over a defined period of time.
- **Community and recreational activities** – targets based on the number of Industry related community and recreational activities held.
- **Industry agility** – targets based on reducing unnecessary requirements and achieving alignment with international best practice.



BIM was mandated in Hong Kong

In Hong Kong, BIM was mandated by Government in 2017 that BIM must be used on all capital works projects with a budget of HK\$30 million or more.

香港特別行政區政府
The Government of the Hong Kong Special Administrative Region

政府總部
發展局
工務科

香港政府總部大樓 2 樓
政府總部西翼 15 樓



Works Branch
Development Bureau
Government Secretariat

18/F, West Wing,
Central Government Offices,
2 Tim Mei Avenue, Tamar,
Hong Kong

Ref : DEVB(W) 430/80/01
Group : 2, 5, 6

27 December 2018

Development Bureau
Technical Circular (Works) No. 18/2018
Adoption of Building Information Modelling
for Capital Works Projects in Hong Kong

Scope

This Circular sets out the policy and requirements on the adoption of Building Information Modelling (BIM) technology.

2. This Circular applies to works either by government staff, consultants or contractors.

Effective Date

3. This Circular takes effect on 1 January 2019.

Effect on Existing Circulars and Circular Memoranda

4. This Circular supersedes DEVB TC(W) No. 7/2017.

DEVB TC(W) No. 18/2018Page 1 of 11

Annex 1

BIM Uses

1. Works Departments shall adopt the stipulated mandatory BIM uses in respective stages of a project. Works Departments may adopt the optional BIM uses when necessary.

	BIM Use	Investigation, Feasibility and Planning	Design	Construction
1	Design Authoring	O	M	M
2	Design Reviews	O	M	M
3	Existing Conditions Modelling	O	M	M
4	Site Analysis	O	M	
5	3D Coordination		M	M
6	Cost Estimation	O	M ^a	M ^a
7	Engineering Analysis		O	O
8	Facility Energy Analysis		O	O
9	Sustainability Evaluation	O	O	O
10	Space Programming	O	M ^a	
11	Phase Planning (4D Modelling)		M ^a	M
12	Digital Fabrication		O	M ^a
13	Site Utilization Planning			M ^a
14	3D Control and Planning			O
15	As-Built Modelling			M
16	Project Systems Analysis			O
17	Maintenance Scheduling			M ^a
18	Space Management and Tracking			O
19	Asset Management			O
20	Drawing Generation (Drawing Production)		M	M

Legend:
M – Mandatory BIM Use for the mentioned stage, including that carried forward from previous stage.
O – Optional BIM Use

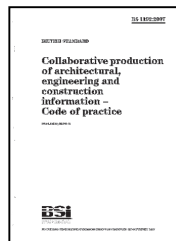
DEVB TC(W) No. 18/2018Page 7 of 11



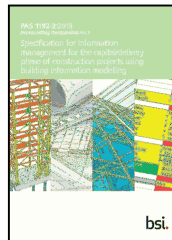
Introduction to ISO 19650

BIM International Standards

UK STANDARDS



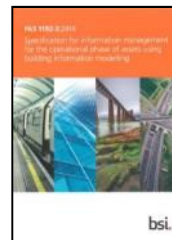
BS 1192



PAS 1192-2



PD 19650-0
Guide to BS EN
ISO 19650



PAS 1192-3



BS 1192-4



PAS 1192-5



PAS 1192-6



BS 8536-1/-2

INTERNATIONAL STANDARDS



ISO 19650-1
2018



ISO 19650-2
2018



ISO 19650-3
2020 (TBC)



ISO 19650-5
2020 (TBC)



Use of standards to support government public policy

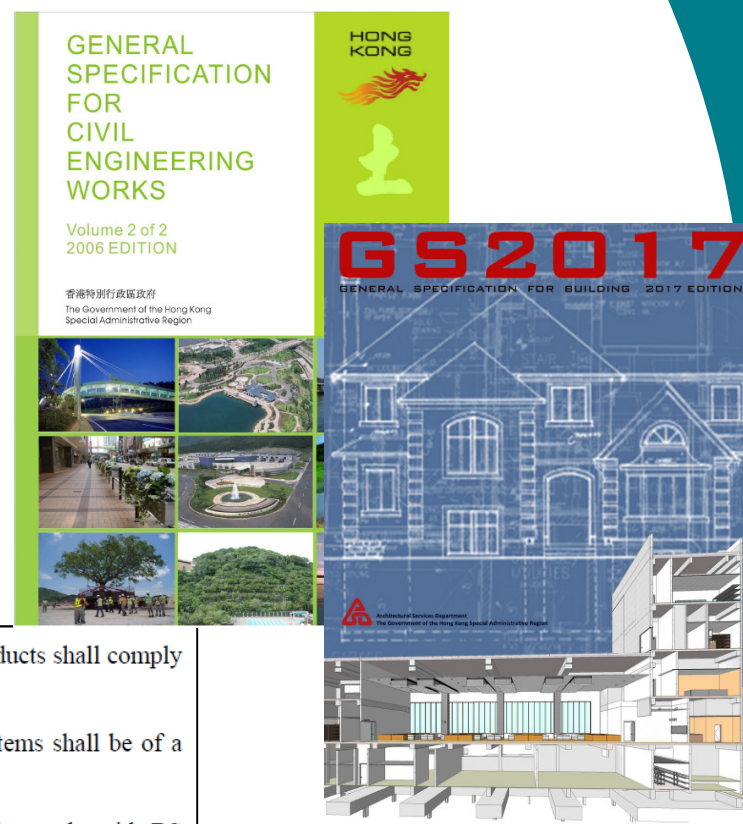
Specifications

- General Specification
(e.g.: CEDD – General Specification for Civil Engineering Works;
https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/stan_gs_2006.html)
- Particular Specification
(e.g.: ArchSD – Particular Specification for Tension Piles)
<https://www.archsd.gov.hk/en/publications-publicity/particular-specifications.aspx>

Paint for conduit and duct systems

13.08

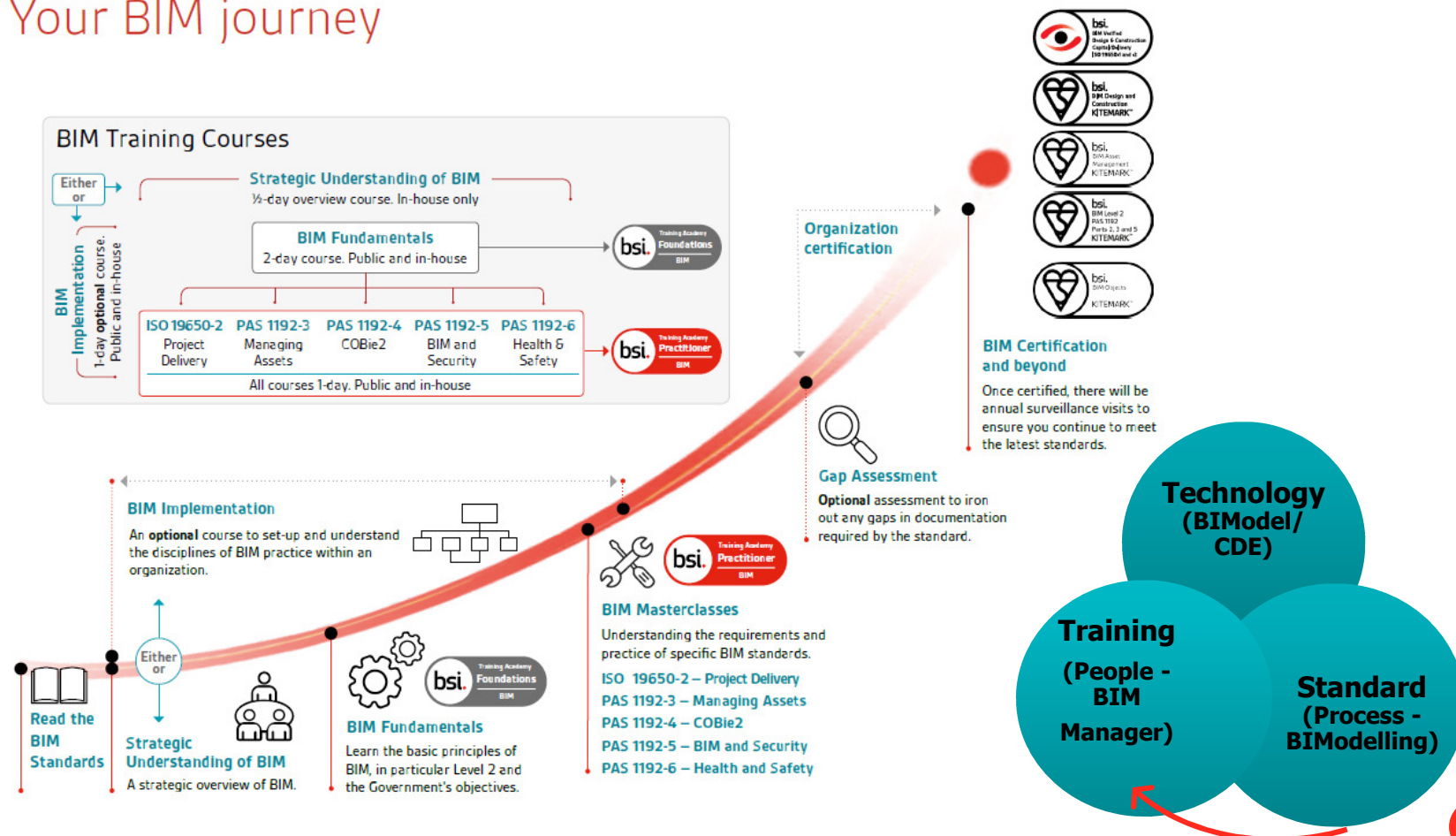
- (1) Bituminous paint for steel conduits and steel cable ducts shall comply with BS 3416, type 1.
- (2) Anti-rust paint for concealed electrical conduit systems shall be of a proprietary type approved by the Engineer.
- (3) Zinc chromate primer for cable duct systems shall comply with BS 4652.





4. Overcoming – Standards and Training

Your BIM journey



HKCIC BIM manager and training scheme for Hong Kong

List of Core Subjects of a BIM Manager Course under the Building Information Management Scheme¹

[illegible]

Core Competen

The Core Co

- | | |
|-----|-----------------------------|
| (1) | BIM In and gu |
| (2) | BIM S
proces |
| (3) | BIM U
applica |
| (4) | Digital
execut
system |
| (5) | Comm
issues |
| (6) | Comm
skills i
meetin |

Minimum Level c

Level 1:	Ge
Level 2:	Kr
Level 3:	Al
Level 4:	Al

Core Subjects of a BIM Manager Course

List of Core Subjects of a BIM Manager Course has defined the minimum course content hour, examination hour, and content of a BIM Manager Course as stipulated in the Schemes. Course providers are required to cover all the subjects in the list for their BIM manager course if they want their courses to be accredited by the Schemes. Course providers have the flexibility to follow the sequence of the list or to follow their own sequence. Course providers also have the flexibility to cover more subjects which are not from the list.

Core Subject Group	Contact Hour	Examination
Core Subject Group 1 – BIM Initiation (minimum 2 hrs)	36	3
Core Subject Group 2 – BIM Software and Technologies (minimum 2 hrs)		
Core Subject Group 3 – BIM Uses and Processes (minimum 19 hrs)		
Core Subject Group 4 – Digital Information Management, Collaboration and Integration (minimum 8 hrs)		
Core Subject Group 5 – Commercial and Contract (minimum 5		

Level of Learning Outcomes

Four levels of learning outcome are set up to map with all the Core Subjects as a means to ensure that the level of learning outcome of each Core Subject is aligned with the course learning outcome as stipulated in the Schemes.

L1 – Appreciation (A) General appreciation of the subject and an understanding of how the subject may affect, or integrate with other subjects.	Lecture only
L2 – Knowledge (K) Knowledge and understanding of the subject and its application.	+ Demonstration
L3 – Experience (E) Ability to perform the subject independently or under supervision.	+ Hands-on exercise
L4 – Ability (B) Ability to perform the subject without supervision and advise others.	+ Hands-on exercise with virtual case

Annex A



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THE UNIVERSITY OF HONG KONG

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CERTIFICATION AND ACCREDITATION





Accreditation Scheme for BIM Training Courses 建築信息模擬培訓課程認證計劃

Certificate of Accreditation Status
認證資格證明書

Name of Course Provider 課程提供機構	BSI Pacific Limited & The Department of Real Estate and Construction, Faculty of Architecture, HKU
Name of Award Granting Body 頒發機構名稱	BSI Pacific Limited & The Department of Real Estate and Construction, Faculty of Architecture, HKU
Course Title 課程名稱	Cloud BIM Manager Professional Training (5 Days)
Qualification Title 資格名稱	Global BIM Manager awarded by CIC
Target Students 對象學生	General Public 公眾
National Learning Hours 學時	Contact hours: 40 (Self-paced hours: 10) 國字時數: 40, 自學時數: 10
Mode(s) of Delivery and Course Duration 授課模式及授課期	Full-time, 5 days 全日制, 5天
Valid Period 有效日期	From 17 June 2019 to 31 December 2020 2019年6月17日至2020年12月31日
Instructor to Student Ratio 師生比例	1:30
Address of Teaching / Training Venue(s) 教學 / 培訓地址	The Department of Real Estate and Construction, Faculty of Architecture, HKU 香港大學建築學院地產及建築系

Albert Cheng

Ir Albert CHENG
鄭定寧工程師
Executive Director
執行總監

Chung

Ir Prof. CHUNG Kwok-fai
鍾國輝教授工程師
Chairperson
Building Information Modelling
Certification and Accreditation 2019
主席
建築信息模擬培訓課程認證及認證

Registration Number: A190301
註冊編號: A190301

Certificate of accreditation: Global BIM manager course



The launch of HKCIC BIM Manager/ Training Schemes

Accreditation of BIM Manager Courses



Certification of BIM Manager



Core Competencies of a BIM Manager

The Core Competencies of a BIM Manager are:

- (1) BIM Initiation (Ability to describe BIM concept definitions and scope, BIM standards and guidelines in the Hong Kong and global contexts).
- (2) BIM Software and Technologies (Ability to explain BIM software, the modelling process, and current and upcoming technologies).
- (3) BIM Uses and Processes (Ability to understand BIM uses and BIM software applications, and to design and manage the overall process of a BIM project).
- (4) Digital Information Management, Collaboration and Integration (Ability to plan and execute the setting-up of a common data environment and data quality control system for effective use and sharing of digital information in a BIM project).
- (5) Commercial and Contractual Aspects (Ability to describe commercial and financial issues of BIM as well as BIM-related contractual issues).
- (6) Communication Skills (Ability to apply effective interpersonal and communication skills in a variety of public and interpersonal settings, such as presentations, meetings, report/training material writing, etc.).

BIM Manager Training



Lecture



Workshop



Presentation



Feedback and assessment

10 Reasons why to join our BIM training:

BSI - NSB Royal Charter Thought Leader BIM Level 2 ISO19650, Kitemark, Quality and Trust

HKU – Top University, Faculty of Architecture, Scholar BIM professor.

HKCIC – Government who Accredited our training, Certify BIM Manager, 1B Levy, CITF Fund, influence to other Government departments.

Mark – Our external examiner, executive course speaker

Rebecca – Well known tutor in BIM, FCI0B

Prof. Tang – Expert in Digital Construction, research in BIM Level 2, 3, 4; Data value, blockchain.

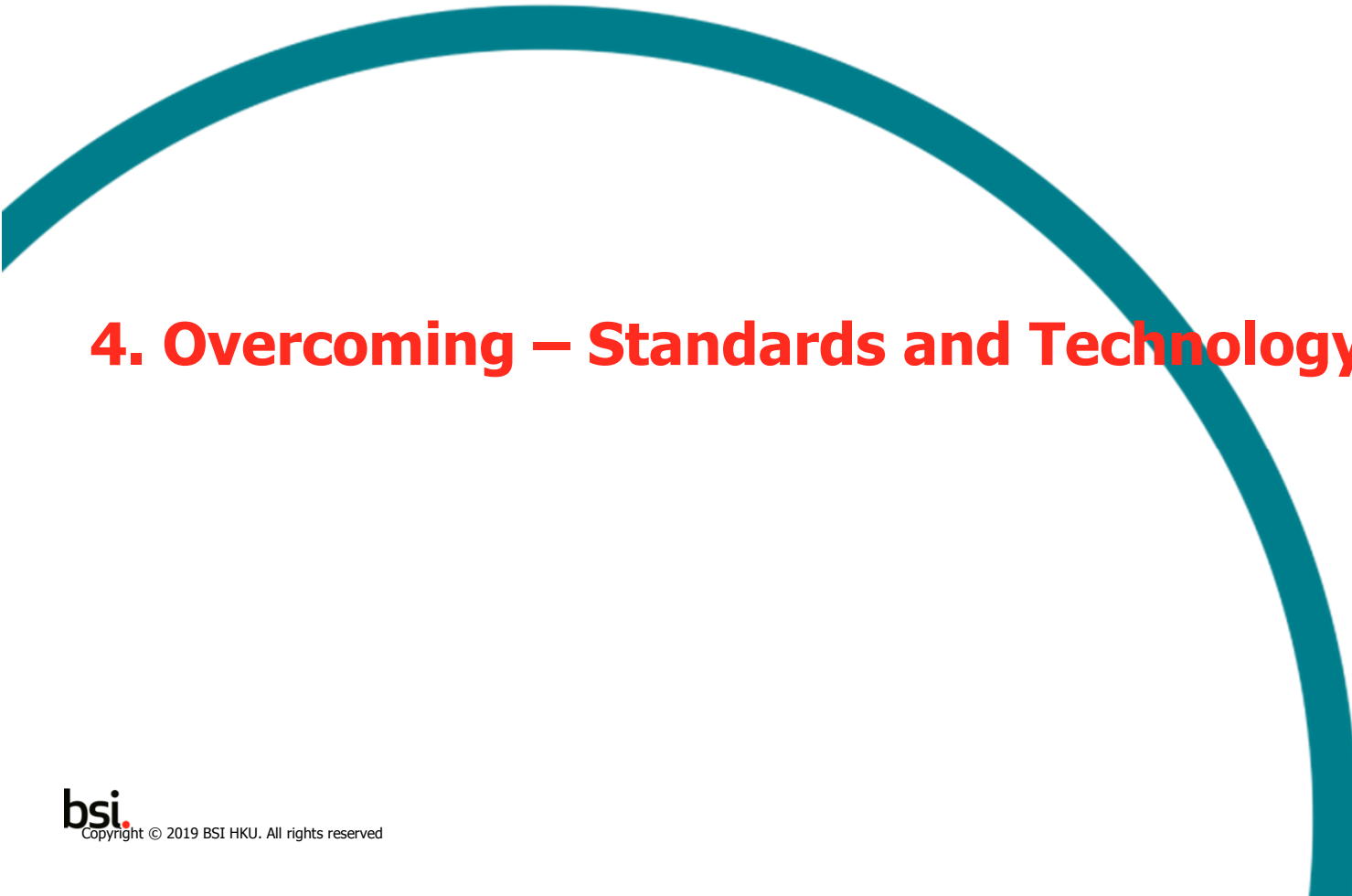
Global vision – From BSI as an international NSB and CB to our tutor's experience from UK, Europe, Australia, Asia, China and Hong Kong

2 Certificates – From both HKU and BSI

Fund – Supported by CITF fund, HKD\$3000/day

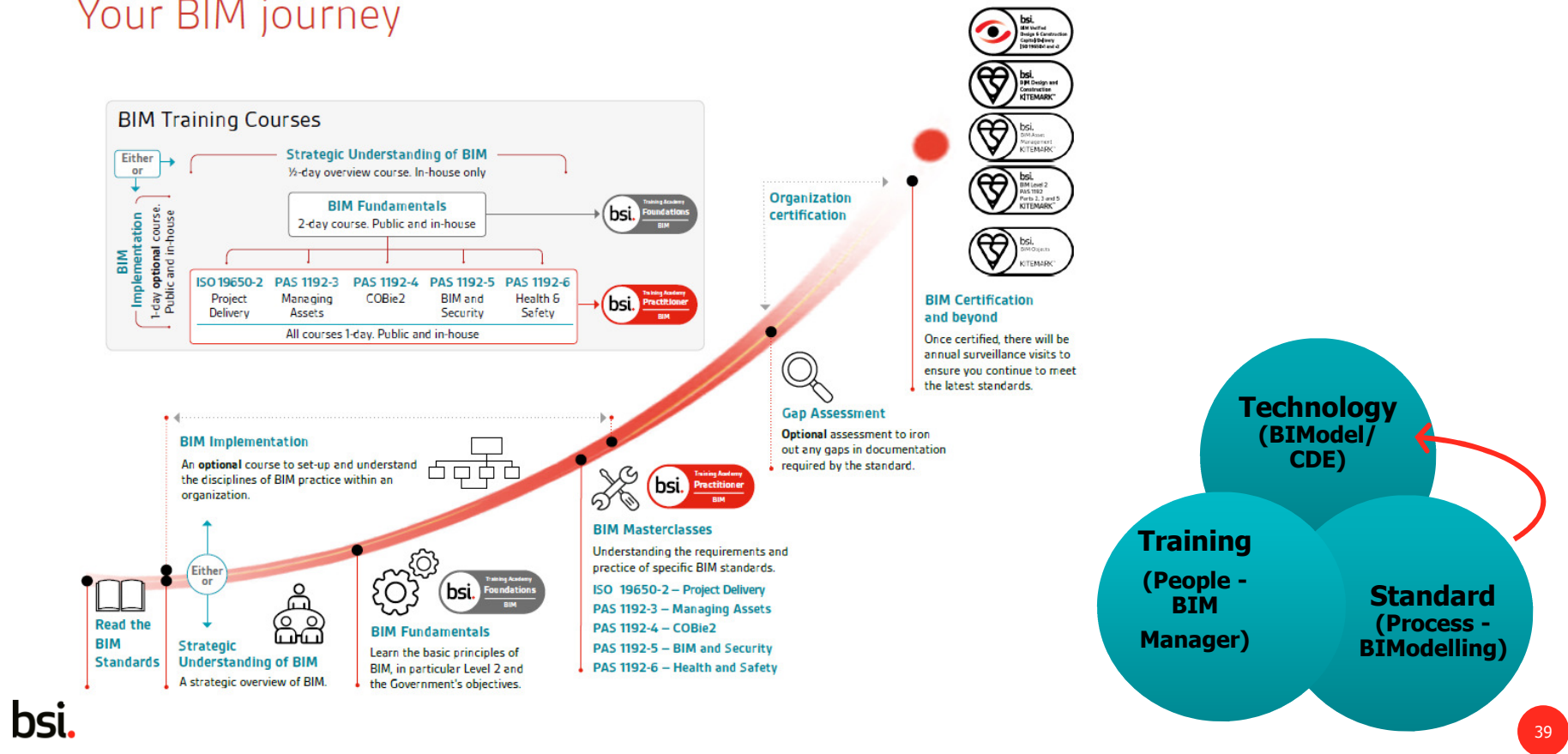
To be connected to Master degree programme of HKU

Classroom – HKU Campus, Knowles building

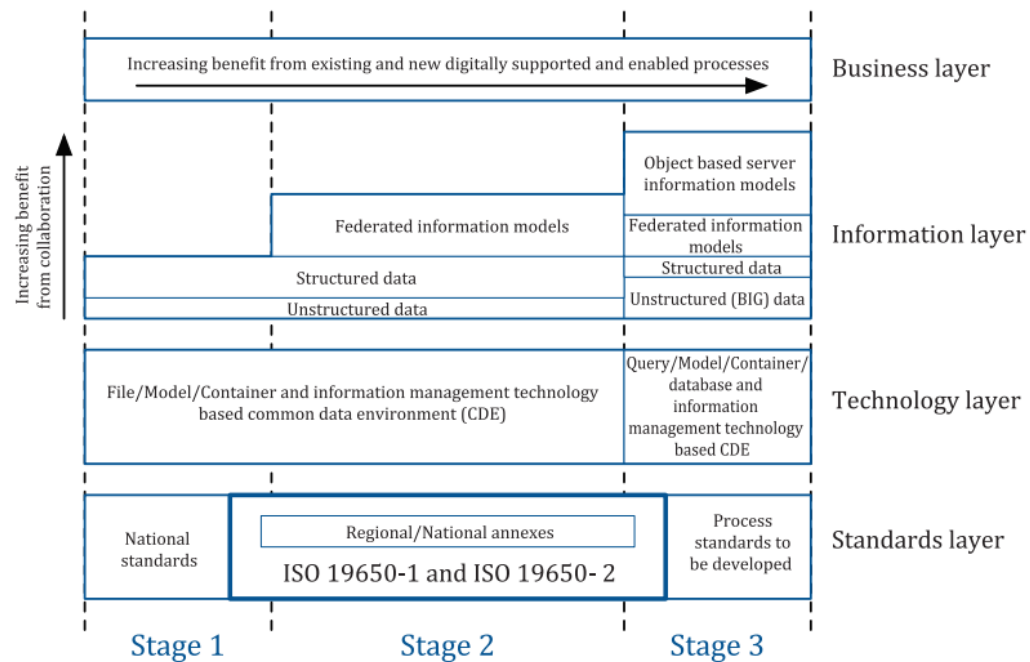


4. Overcoming – Standards and Technology (CDE)

Your BIM journey



ISO 19650-1 : A perspective on stages of maturity of analogue and digital information management



BS EN 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

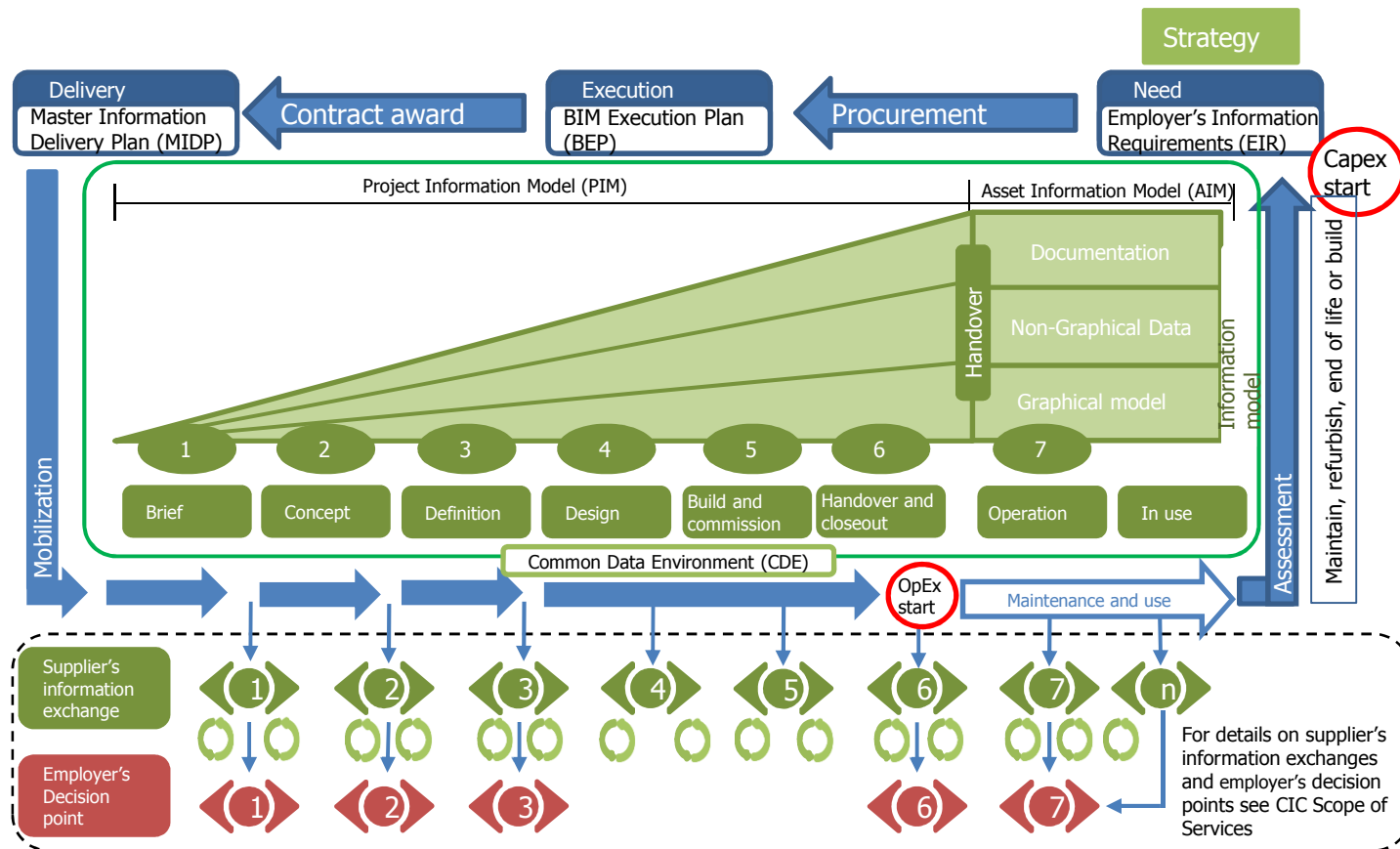
Part 1: Concepts and principles

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Information delivery cycle



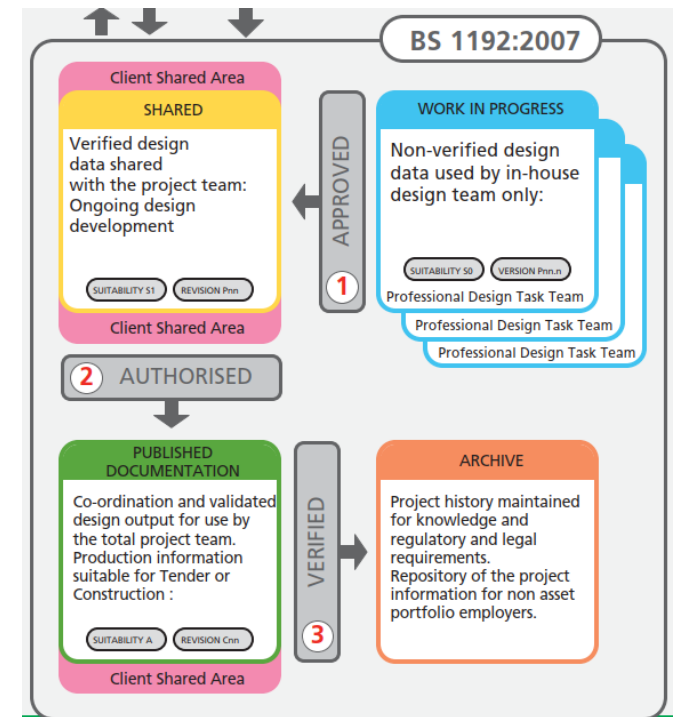
Common Data Environment (BS1192:2007)

The CDE is a means of providing a collaborative environment for sharing work and can be implemented in a number of ways.

Functional sections of CDE are:

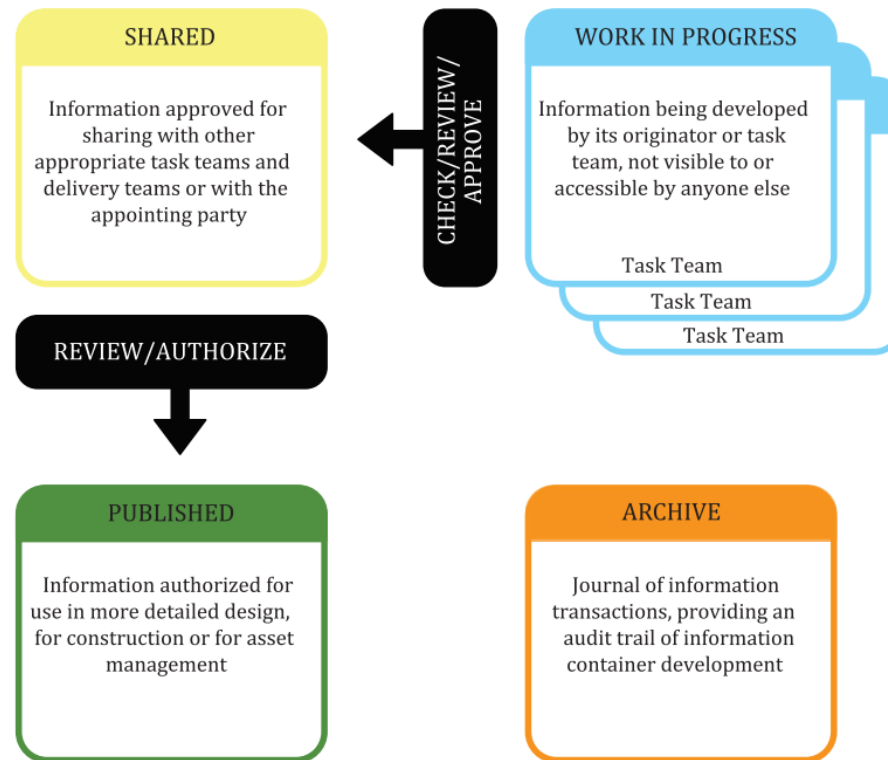
- Work in progress
- Client shared area
- Published documentation
- Archive

There are “gates”, or sign-off procedures, that allow data/information to pass between the sections: APPROVED, AUTHORISED and VERIFIED.



Common Data Environment (ISO19650-1)

Concept



CDE Function requirements from UK government

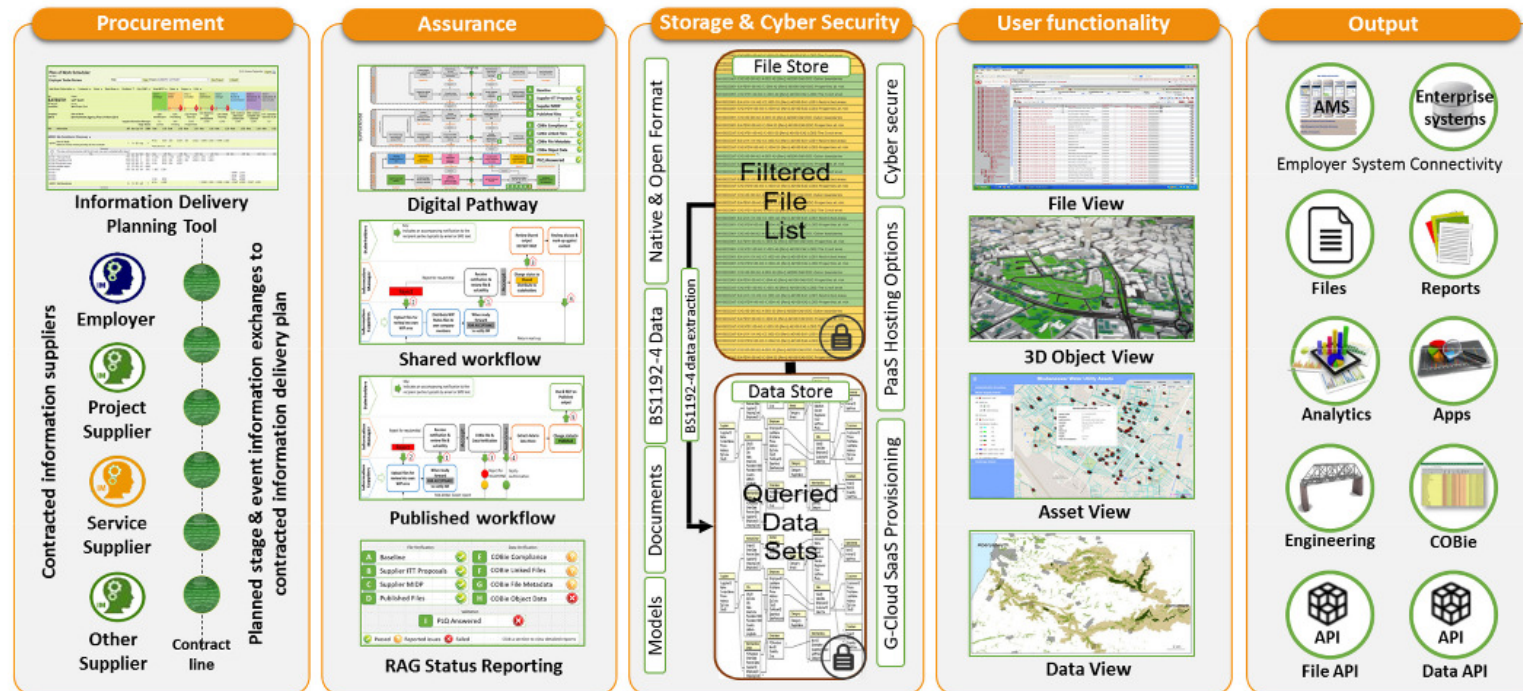
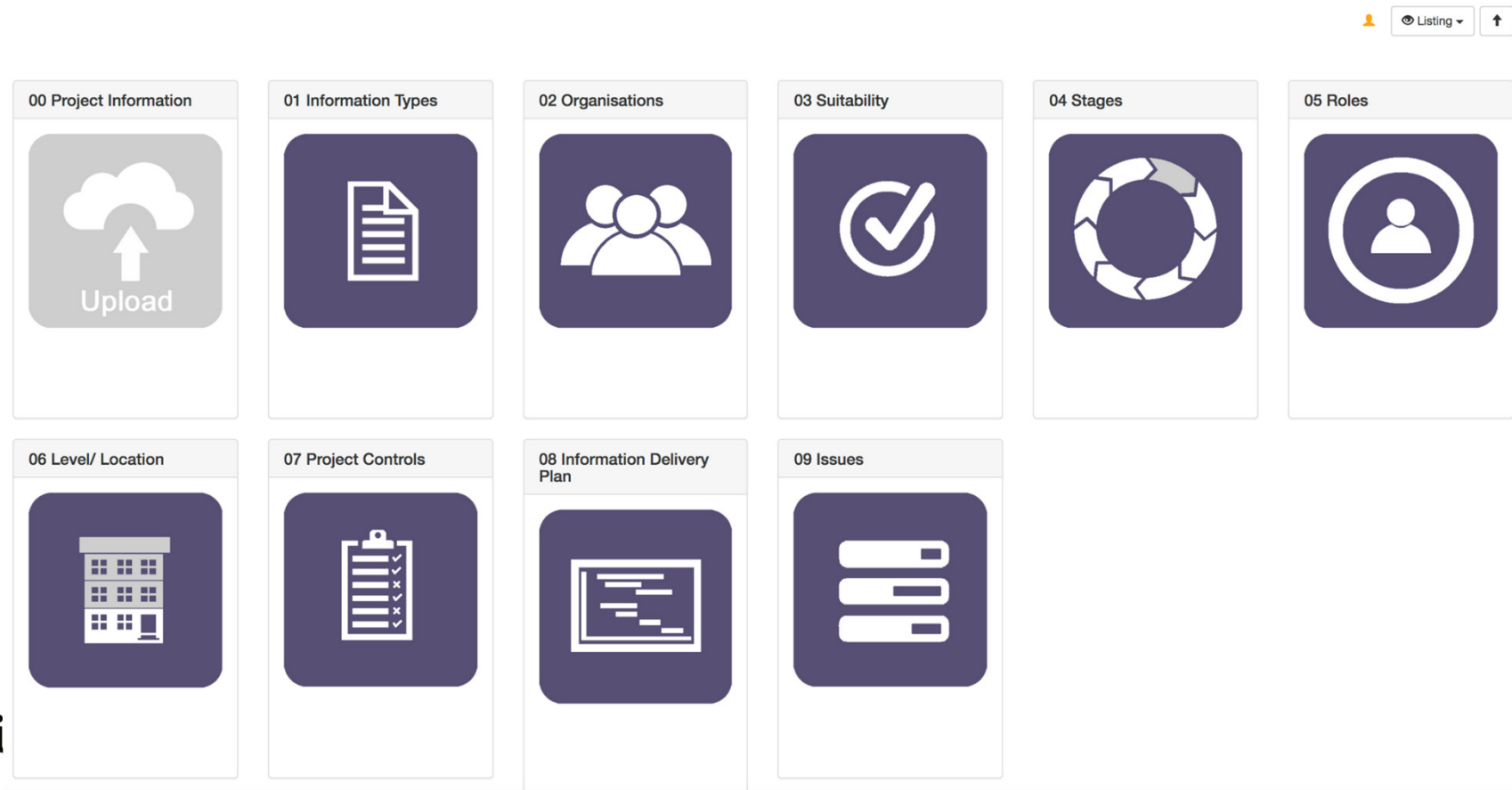


Figure 4 - Functional Requirements Summary

Source: Asset Information Management – Common Data Environment Function Requirements
UK Government BIM Working Group – CDE Sub Group

The aim is to help asset owners and operators to procure information in accordance with industry standards, namely BS 1192:2007+A2:2016, PAS 1192-2:2013, PAS 1192-3:2014, BS 1192-4:2014, PAS 1192-5:2015 BS 8536-1:2015 and BS 8536-2:2015.

CDE Example –Project home page





BIM Kitemark Certification

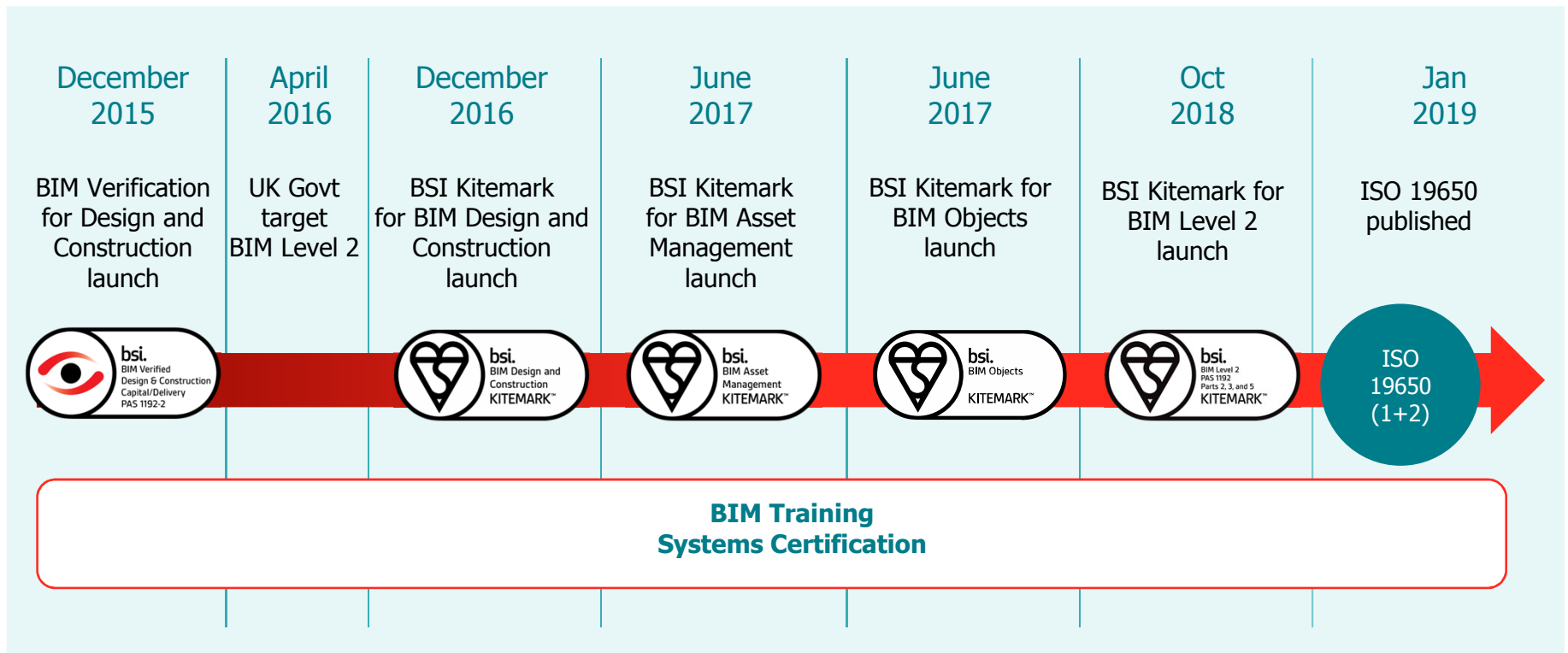
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Our BIM Kitemark Journey





 **SANDERSON WATTS ASSOCIATES**
 Consulting Engineers

 **alan johnston partnership LLP**
 CONSULTING STRUCTURAL & CIVIL ENGINEERS

 **United Design Group**



Assessment of the Common Data Environment (CDE)

Architecture

- Software/systems used
- Interoperability of software/systems

Process

- CDE setup
- CDE management

Functionality

- CDE use



Certification solutions

BSI Kitemark™ for BIM Design and Construction



Demonstrates:

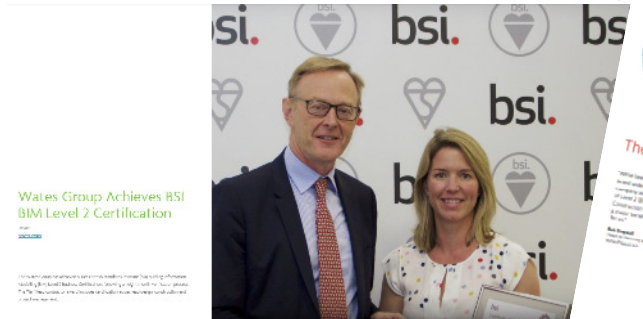
- Processes and procedures are embedded in your business
- Evidence of your personnel competency for BIM
- Compliance with the UK government 2016 condition of contract

Plus:

- Your **capability and successful delivery** of BIM projects
- Provides **confidence to your clients** that previous clients are satisfied with your work
- Your **BIM maturity** in the market place
- Brand recognition with BSI Kitemark™

Enabling BIM adoption around the World

Working together to promote your achievement



Enabling BIM adoption around the World Middle East

- Applying **BIM** to the entire lifecycle of the asset
- Adoption of **Partnership** approach across the supply chain



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“ I congratulate RTA on their achievement in becoming the World’s first organization to be awarded the Kitemark across the whole asset lifecycle”

BSI Group

**Value of Kitemark
Middle East**



What our clients tell us? Google/ Youtube BSI BIM Kitemark

ATKINS

<https://www.youtube.com/watch?v=OK5DFsShkdU>



https://www.youtube.com/watch?v=hzjLLDwwU_w



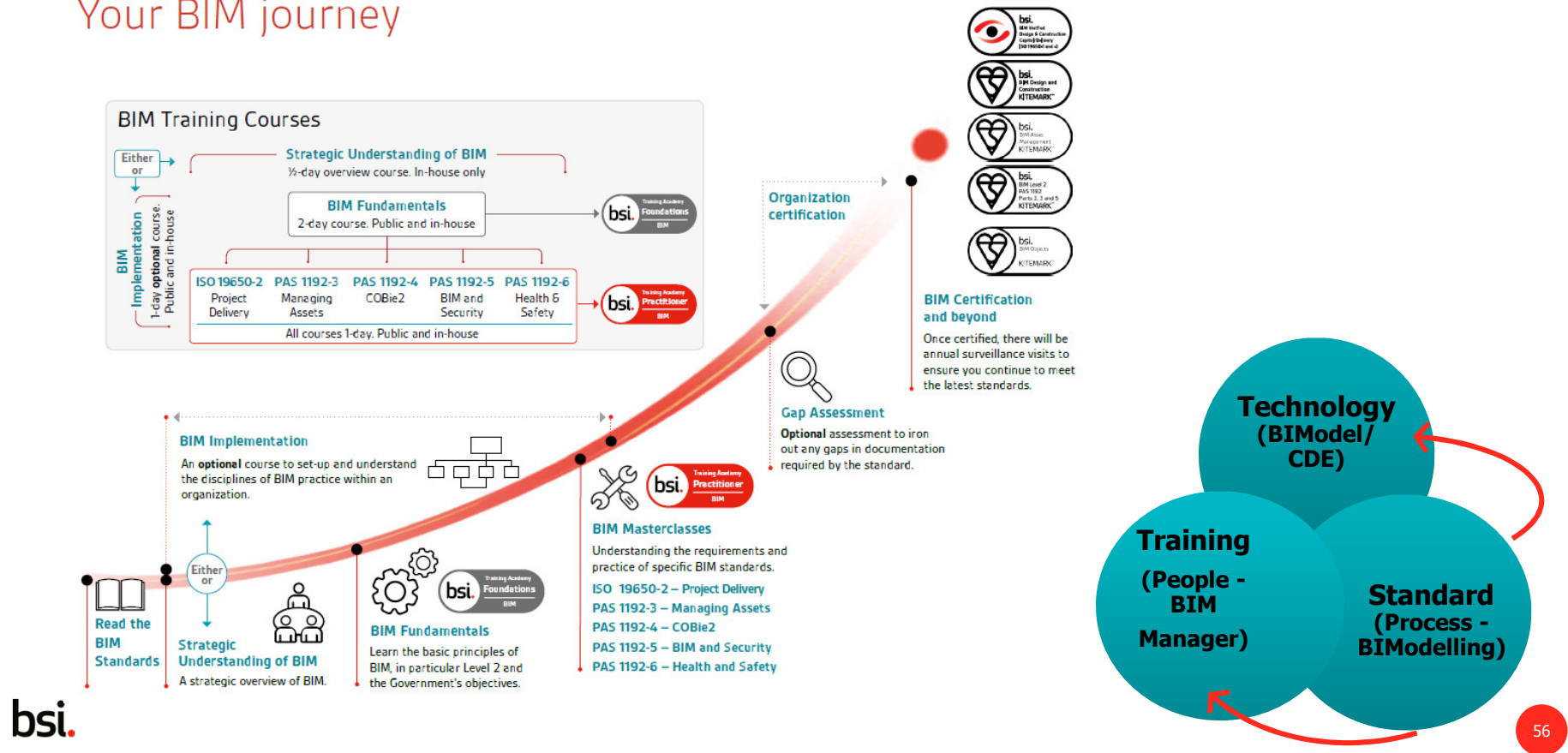
<https://www.youtube.com/watch?v=jSJnsrCYdMQ>



**Built Environment
community.**

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Your BIM journey





Thank you

Email: Kevin.wong@bsigroup.com



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