



A context map

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Context to

- Offsite Construction and ...
 - Regulation
 - Testing standards
 - Design standards
 - Industry standards
 - National, international
 - Best practice
 - Requirements
 - Testing
 - Insurance
 - Assurance
 - Warranty
 - Guarantee



Uncertainty / patterns / insights

Clarity / Focus

Research

Concept

Design



Why are standards important?

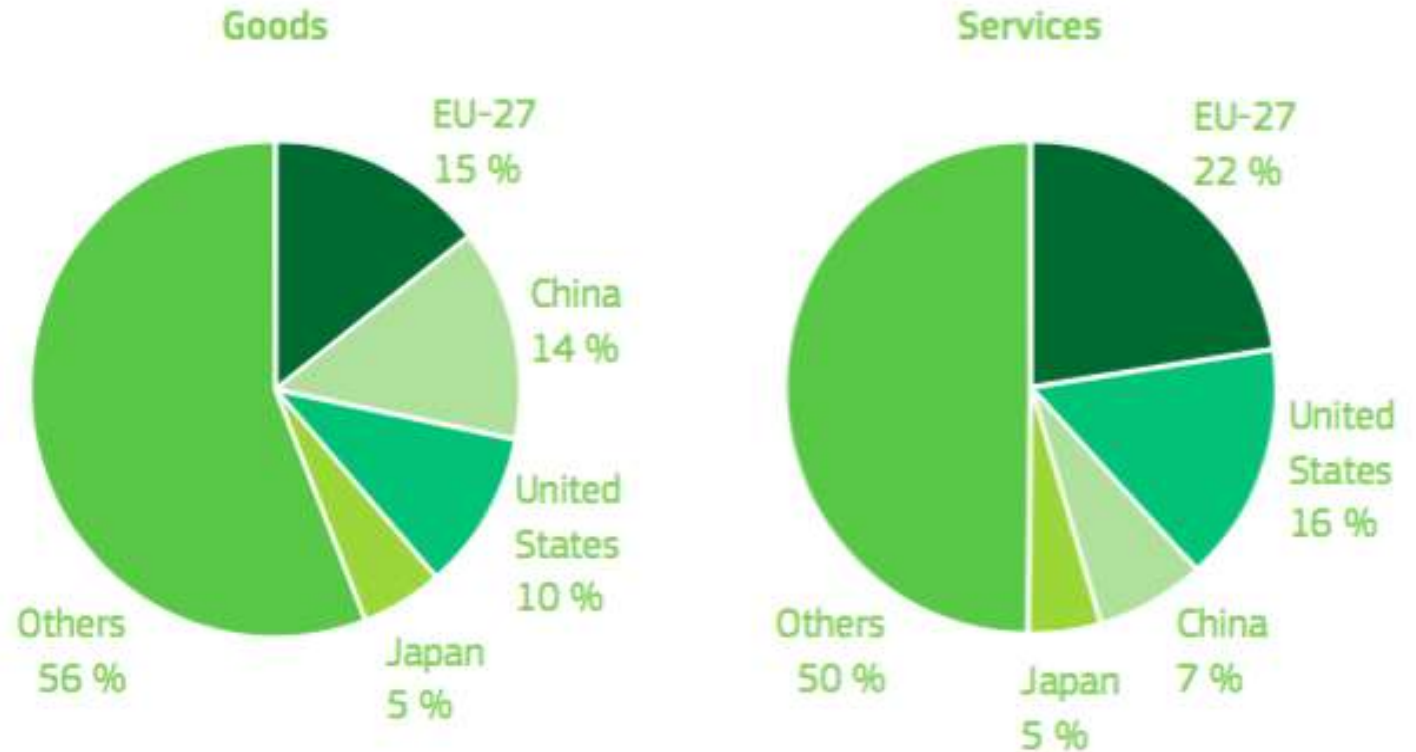
- unify performance statements
- consensus-driven, facilitating trade
- are consistent, open and transparent
- build trust and common understanding
- allow networking, platforms and coordination
- communicate societal goals and industry benchmarks
- use holistic approaches and analysis
- are a strategic instrument: Review, contrast, compare, benchmark
- linked to public perception

'A transparent framework for conformity assessment of products is a vital springboard for the European construction industry to increase its competitiveness in the European market and expand into global markets'

In the context of its international trade negotiations, the EU has been seeking commitments to facilitate the exchange of goods and services for the benefit of both sides. A clear regulatory framework together with transparent and effective common rules and technical standards

for performance assessment are essential to remove trade barriers so that all firms, particularly small and medium-sized enterprises (SMEs), have access to international markets and to the European Union's internal market, with 28 countries and 500 million consumers.

Share of world trade in 2012
(data from Eurostat).



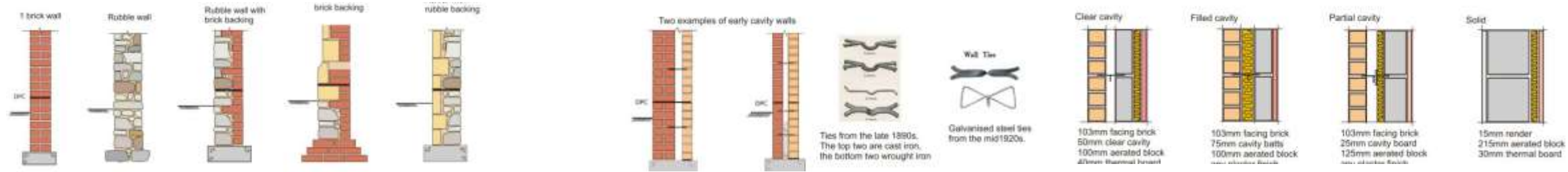
Enabling

- Since the beginning of recorded history
- About **5,000 years ago** Sumerian (earliest known civilization) farmers developed the calendar as we know today: 12 lunar months, 30 days per month, 12 hours day-12 hours night.
- King Henry I (**1068-1135**) 'defined' a standardized measurement by the instituting the 'ell' equivalent of the length of his arm
- Industrial revolution (**1760-1840**): Transport of goods, increased demands for transportation to feed trade. Railroad was fast and economical, standardization of the railroad gauge, equal distance between track crucial to move goods about
- 20th Century: the era of the 'big city' (Brooklyn Bridge, **1869-1883**) ' ..it was a symbol of how the burgeoning city of New York saw itself: as the greatest metropolis on earth.'



Julie's approximate timeline

Example: Typical wall constructions



1840

1901

1917

1918

1947

1961

1980



in-house company
standardisation

DIN (Germany)

UK Engineering
standards
Committee

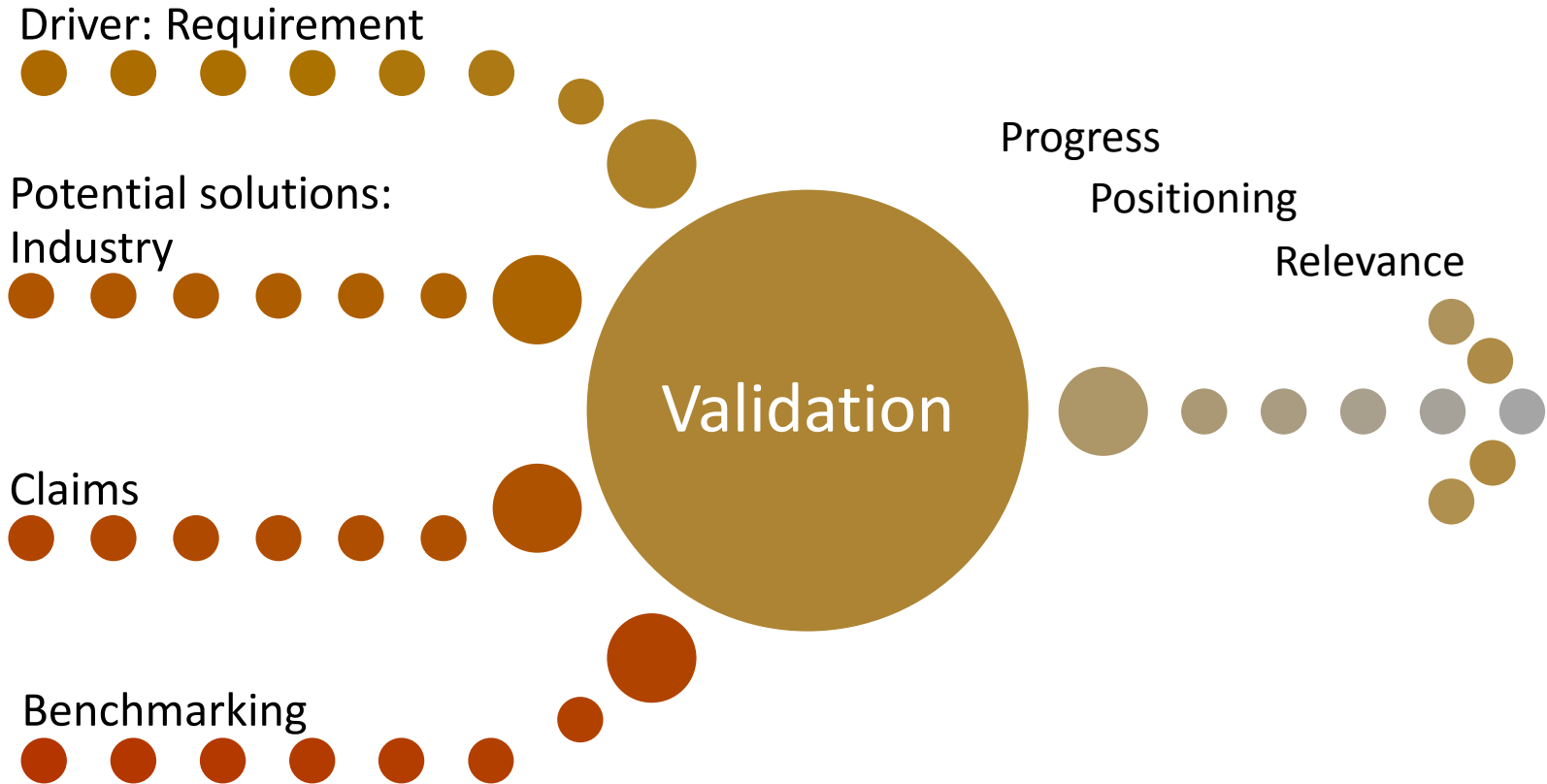
BSI (UK)
ANSI (US)
NF (France)

ISO

CEN

European
structural
design rules

The pattern



The landscape



The landscape

Asset protection
and acceptability



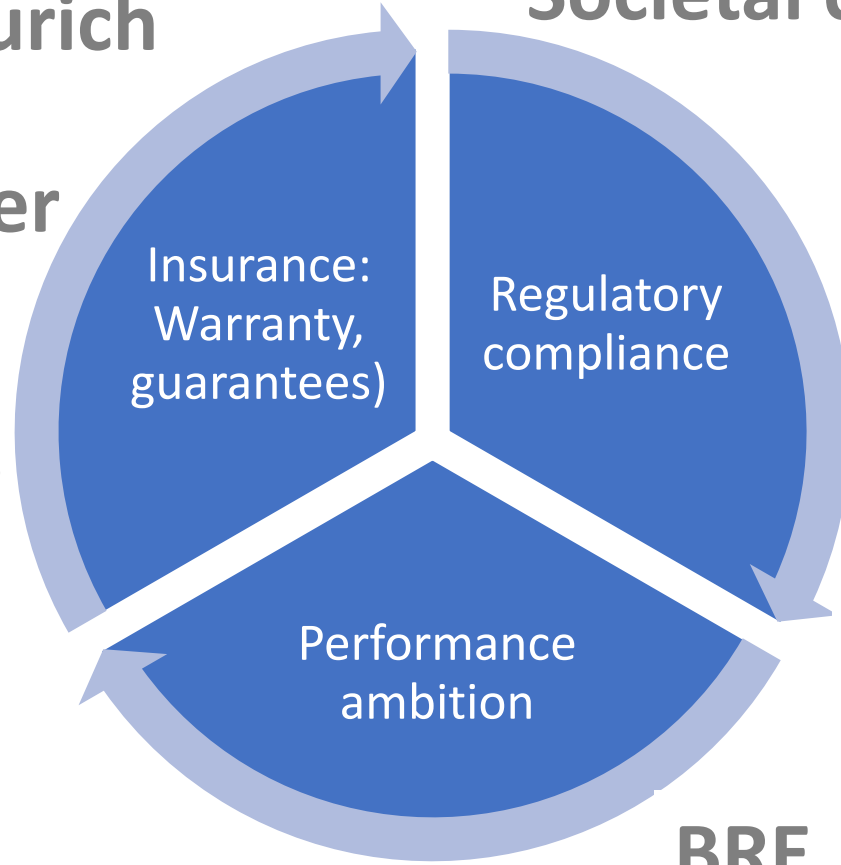
Safety
'must' perform

Consumer, industry
'can' perform- benefits

Who does what? Some examples



Zurich
Premier
BOPAS



'Self-declaration' by provider

BRE

Government

Societal choice and best practice

Building Control

Requirement	Limits of
Disproportionate collapse	
A3. The building shall be constructed so that in the event of an accident the building will not suffer collapse to an extent disproportionate to the cause.	

Guidance

Testing and assessment of 'evidence'

Eurocode 1: Actions on structures – Part 3: Actions induced by cranes and machinery; with UK National Annex to BS EN 1991-3:2006.

BS EN 1992-1-1:2004 Eurocode 2: Design of concrete structures – Part 1.1: General rules and specific rules for buildings with UK National Annex

BS EN 1993-1-1:2005 Eurocode 3: Design of steel structures – Part 1.1:

BS EN 1993-6:2007 Eurocode 3: Design of steel structures – Part 6: Crane supporting structures with UK National Annex BS EN 1993-6:2007

BS EN 1994-1-1:2004 Eurocode 4: Design of composite steel and concrete structures with UK National Annex BS EN 1994-1-1:2004

Standards

Reach

The completed home:
First 2 years, maximum
of 10 years
'Performs without damage'

For the homeowner

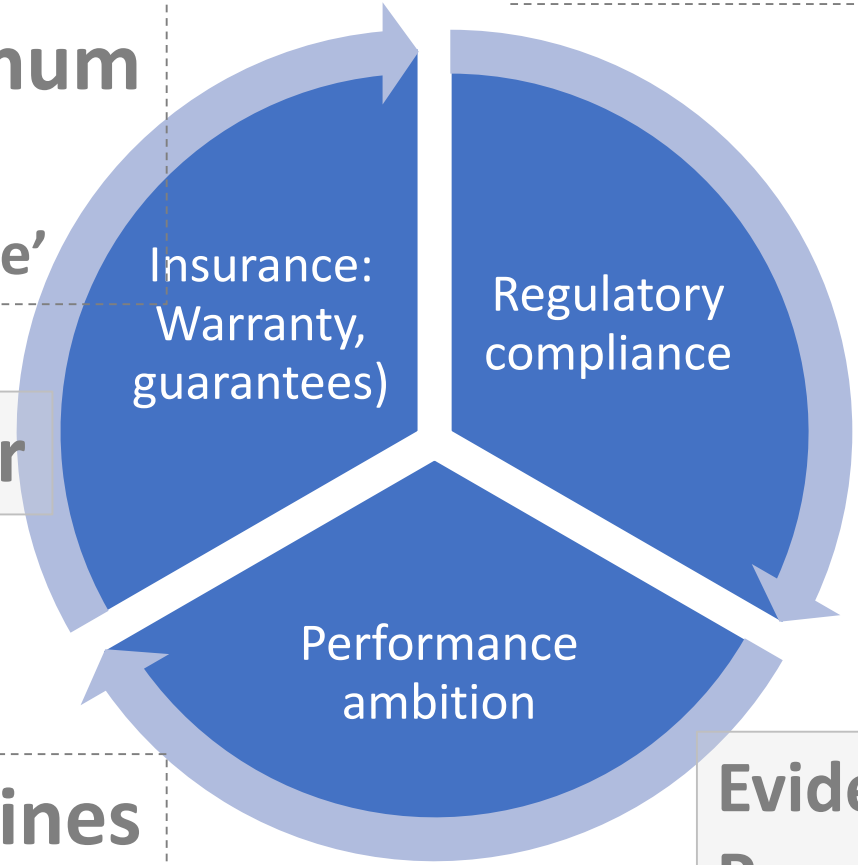
Various timelines

At inception and for 50-60 years+
(Average 120 years)

All: Buildings, owners,
construction industry,
Users

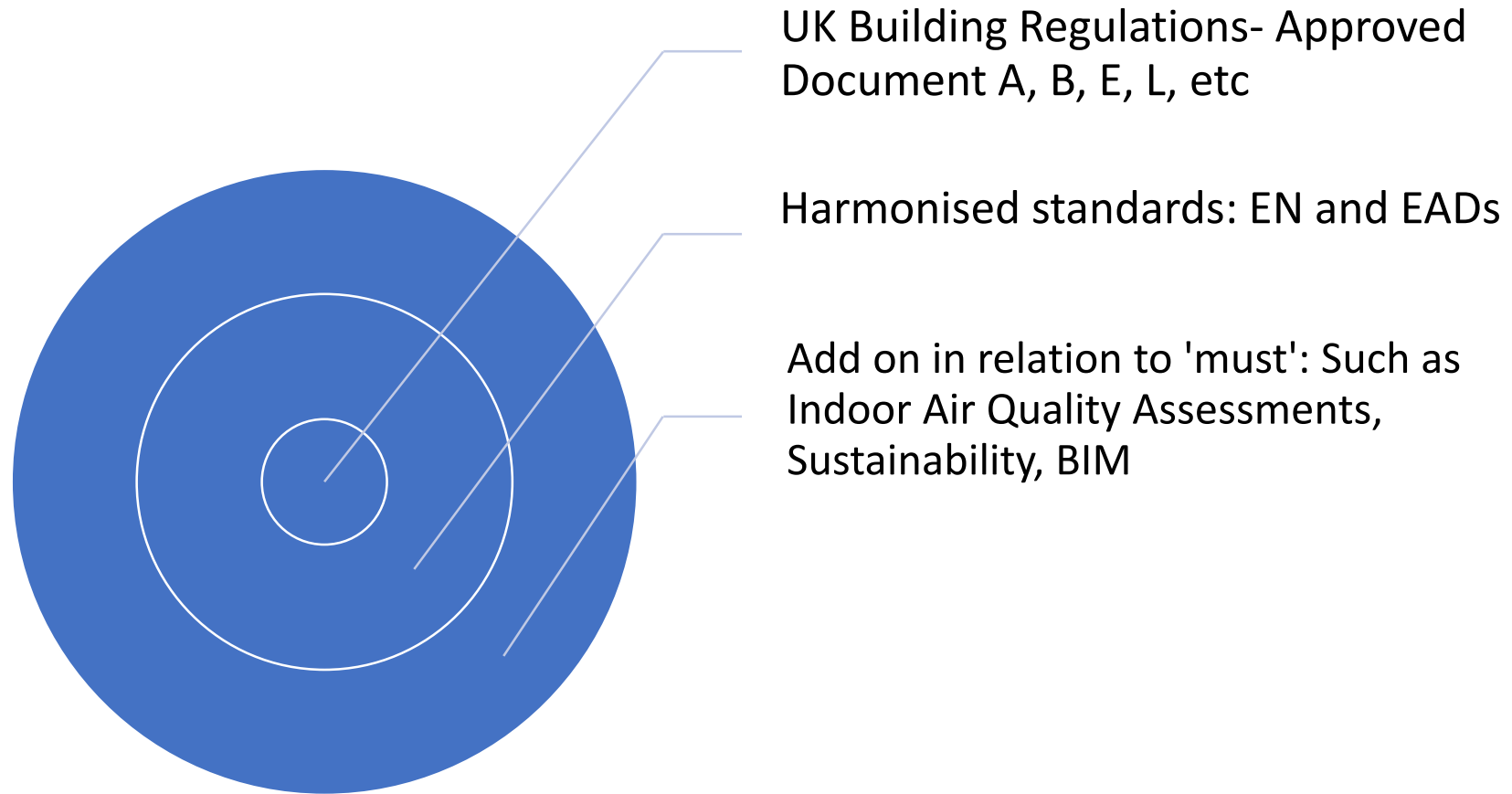
Mandatory

Evidence:
Provider of building- builder,
manufacturers, material suppliers

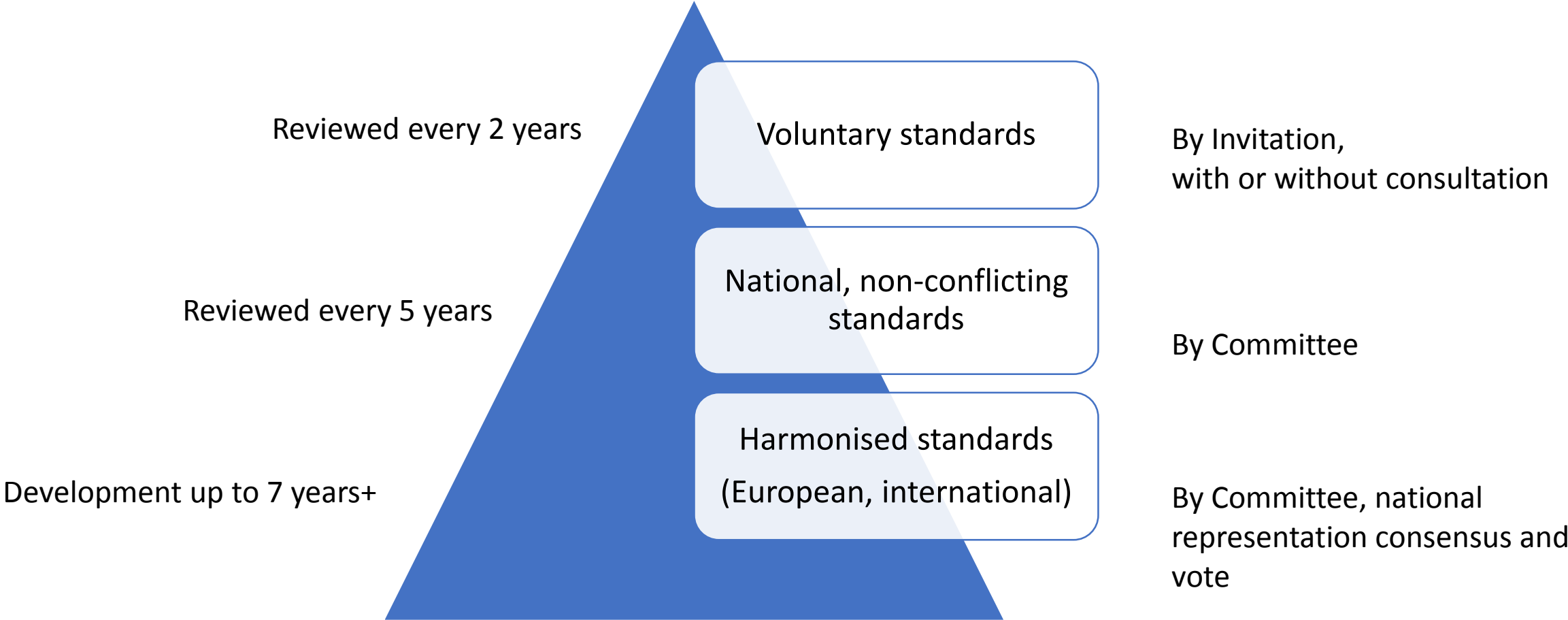


Optional

Regulation, performance, compliance



Types of standards and expected performance for 'mandatory' items



'Essential' requirements

1. Mechanical resistance and stability
2. Safety in case of fire
3. Hygiene, health and the environment
4. Safety in use
5. Protection against noise
6. Energy economy and heat retention
7. Sustainable Use of Resources

UK implementation

Regulation 3 Construction Products
Regulations 1991: Requirements to be
satisfied by products

A construction product shall have such characteristics that the works in which it is to be incorporated can satisfy the essential requirements when, where and to the extent that such works are subject to regulation

STATUTORY INSTRUMENTS

1994 No. 3051

BUILDING AND BUILDINGS

**The Construction Products (Amendment) Regulations
1994**

Made 30th November 1994
Laid before Parliament 8th December 1994
Coming into force 1st January 1995

The Secretary of State, being a Minister designated^(a) for the purposes of section 2(2) of the European Communities Act 1972^(b) in relation to measures relating to construction products, in exercise of the powers conferred on him by the said section 2(2) and of all other powers enabling him in that behalf, hereby makes the following Regulations:

Citation, commencement and application

1.—(1) These Regulations may be cited as the Construction Products (Amendment) Regulations 1994 and shall come into force on 1st January 1995.

(2) Until 1st January 1997 nothing in these Regulations shall prevent a product which bears an EC marking in accordance with the 1991 Regulations^(c) from being placed on the market and brought into service.

Interpretation

2. In these Regulations “the 1991 Regulations” means the Construction Products Regulations 1991.

Amendment to the Construction Products Regulations 1991

3. In the 1991 Regulations for the words “EC mark” in each place where they occur there shall be substituted the words “CE marking”.

4. Regulation 2(1) of the 1991 Regulations (Interpretation) shall be amended as follows—

(a) after the definition of “certification body” there shall be added the following definition—

“CE marking” means the CE conformity marking referred to in regulation 5 consisting of the symbol “CE” in the form provided for in Schedule 1”

(b) the definition of “EC mark” shall be omitted; and

(c) in the definition of “the Directive”, after the words “relating to construction products” there shall be added the words “as amended by Council Directive 93/68/EEC relating to the CE marking of construction products^(d)”.

(a) S.I. 1989/2393.
(b) 1972, c.68.
(c) S.I. 1991/1620.
(d) O.J. No. L220, 30.8.93, p.1.

[DET 8152]

Elements of performance marking

- a harmonized system of technical specifications and requirements
- an agreed system of attestation
- a framework of notified bodies
- Marking of products
- Reliable conformity assessment
- Consistent approach: Modules for the various phases of assessment procedures
- Quality assurance ISO EN 9000 series
- Operating quality EN 45000 series

Development of rules depending on

- Consequences of failure of the product
- Product characteristics
- effect of variability on serviceability
- susceptibility to defects in manufacture
- nature of the product

Attestation levels- Examples

Examples of materials and products that have to meet the appropriate attestation system

Attestation level	Example of materials or products
1+	Cement; Reinforcing steels
1	Timber/ steel frame buildings; concrete frame buildings
2+	Pre-cast concrete products; Structural timber roof members
2	Building limes
3	Damp proof courses
4	Sanitary products

Manufacturer declares product conforms
3rd party certification of FPC
Own Initial Type Test
(2+ with continuous surveillance)

System 1 (1+)
3rd party certification of product and factory production control (FPC)
(1+ with audit testing)

Two types of 'harmonised' standards

- European standards (CEN material or product standards)
 - Key section in all CEN material and product standards I
 - ANNEX ZA – *“Clauses of this European standard addressing the provisions of the EU Construction Products Directive”*. These clauses need to be specified for CE Marking
- European technical approvals- European Assessment Document EAD

Directives cover

- Low voltage equipment
- Simple pressure vessels
- Toys
- **Construction products**
- Electromagnetic compatibility
- Machinery
- Personal protective equipment
- Non-automatic weighing instruments
- Gas appliances
- Hot water boilers
- Civil explosives
- Medical devices
- Potentially explosive atmospheres
- Recreational crafts
- Lifts
- Refrigeration appliances
- Pressure equipment
- Telecommunication terminal equipment
- In-vitro diagnostic devices
- Radio and telecommunications terminal equipment

Construction Products Regulation 'CPR'
Covers largest number of standards,
600 products covered
1,500 supporting test standards



How regulated characteristics are shown in standards

Annex ZA - Compulsory Informative Annex

Part 1 - Clauses addressing essential characteristics

Requirement /Characteristic from the Mandate:	Requirement Clause(s) in this or other European standards	Mandated levels and/or classes	Notes:
-	-		
-	-		
-	-		
-	-		

Summary

Durability/performance of asset up to 10 years
Performance in first 2 years (such as shrinkage, drying)

Can also include of review of 'repairability'



Indoor Air quality, Health and Wellbeing, BIM, etc
Augmented performance achievements

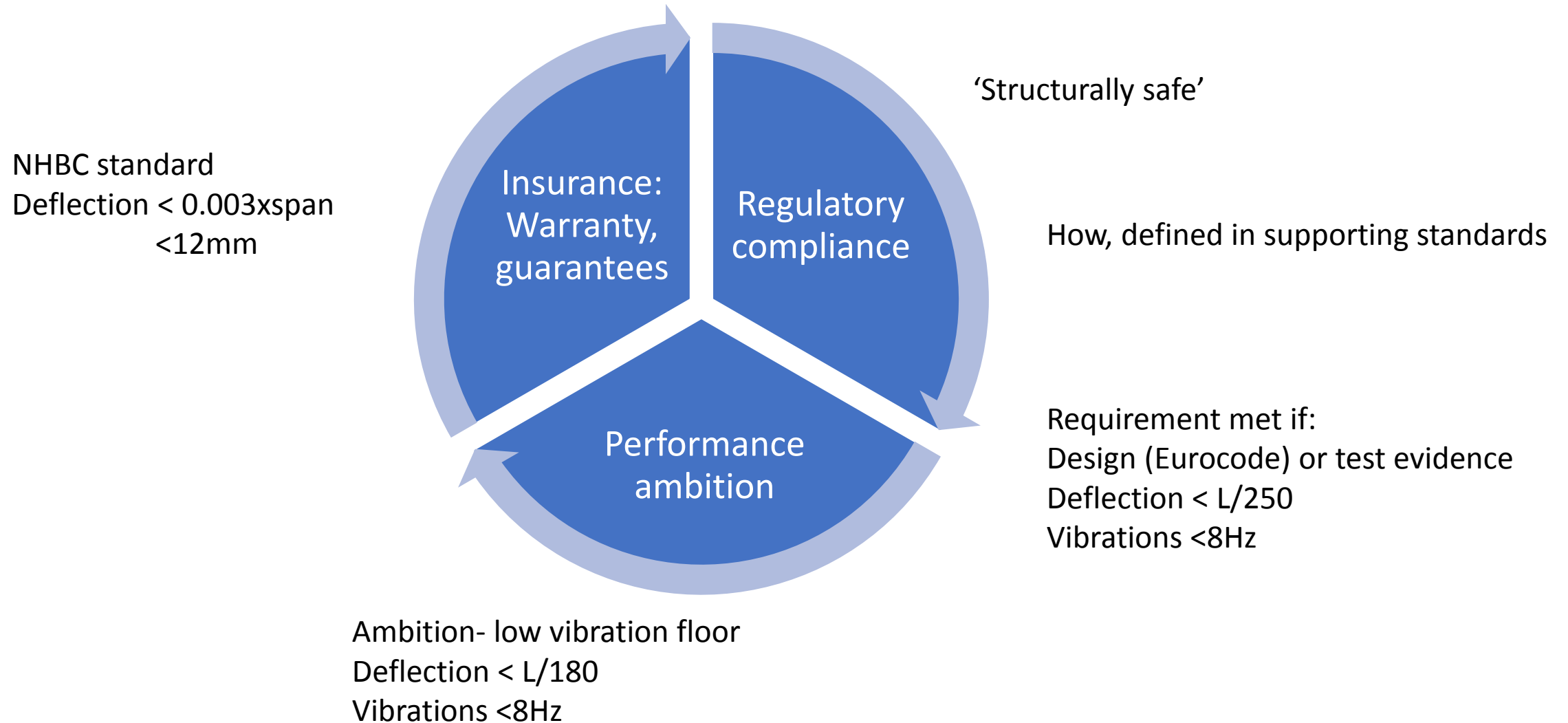
+ Factory Production Control

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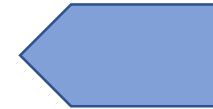
A simplified example:

Structural performance- floor deflections



BRE's AMSCI standard

- European Standards
- International Standards
- Best practice
- Industry standards
- Regulation
- Insurance standards
- Voluntary standards



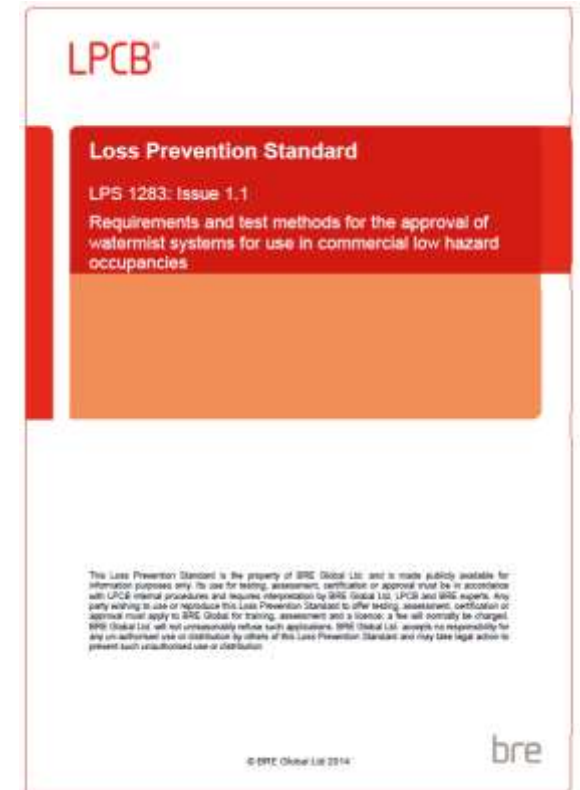
Must

Also

Optional

The AMSCI standard does

- fill gaps, ‘tops up’ published National & International standards
- enables to fast-track manufacturers to providing innovative new technologies to market
- associate an appropriate published standard to the factory production control (fpc) and quality management requirements and if required audit sampling – enabling certification
- Insurers, Government and other end users recognise appropriate products to meet regulations/ requirements



Responsibilities

Responsibilities

- Manufacturer: Responsible for designing and manufacturing (includes re-conditioning) can be within or outside Community
 - Obligation to ensure is designed and manufactured in accordance with essential requirements
 - Conformity assessed
 - Allowed to use finished products, ready-made parts or components. Sub-contracting is allowed but overall control and necessary competence are required
 - Always retains overall responsibility and liability
- Authorised representative: As manufacturer above
- Importer/ person responsible for putting product on market
 - Must be fully aware and in some cases able to provide the market surveillance authority with necessary information regarding the product

Responsibilities (continued)

- Distributor:
 - No special requirement or preferential relationship with manufacturer
 - After the product has been placed on the market they can take commercial actions
 - Should act with due care and have basic knowledge of the applicable requirements (e.g. what products should bear CE mark, language requirements for user's instructions, etc.)
- Assembler/ installer: Putting products into service
 - Installation has an impact on maintaining performance and compliance
 - Ensure they do not cause a non-compliance

Responsibilities (continued)

- User/ employer:
 - No specific requirements
 - Health and safety in the workplace
 - Member states are allowed to adopt or retain more stringent provisions as long as they are compatible with the EX treaty. The provisions must be respected
- Product liability: All products, services excluded
 - Related to safety NOT functionality
 - Liability on producer (manufacturer, authorised representative)
 - If 'producer' is not identifiable suppliers are liable
 - Established list of exclusions
 - 10 years then liability ceases (unless legal action is pending)

Thank you!