A context map

Julie Bregulla
Many terms - subtle differences
Context to

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

From: The European Construction Industry, a global partner, 2014
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: in-house company standardisation

1901: UK Engineering standards Committee

1917: DIN (Germany)

1918: BSI (UK)

1947: ISO

1961: CEN

1980: European structural design rules

The pattern

Driver: Requirement
Potential solutions: Industry
Claims
Benchmarking

Validation

Progress
Positioning
Relevance
The landscape

- Regulatory compliance
- Performance ambition
- Insurance: Warranty, guarantees
The landscape

- Asset protection and acceptability
- Performance ambition
- Regulatory compliance
- Insurance: Warranty, guarantees

Safety ‘must’ perform

Consumer, industry ‘can’ perform- benefits
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

Optional

Insurance: Warranty, guarantees)

Regulatory compliance

Performance ambition

Evidence: Provider of building- builder, manufacturers, material suppliers
Regulation, performance, compliance

- UK Building Regulations - Approved Document A, B, E, L, etc
- Harmonised standards: EN and EADs
- Add on in relation to 'must': Such as Indoor Air Quality Assessments, Sustainability, BIM
Types of standards and expected performance for 'mandatory' items

- **Voluntary standards**: Reviewed every 2 years. By Invitation, with or without consultation.
- **National, non-conflicting standards**: Reviewed every 5 years. By Committee.
- **Harmonised standards (European, international)**: Development up to 7 years+. By Committee, national representation consensus and vote.
‘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
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.
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

<table>
<thead>
<tr>
<th>Attestation level</th>
<th>Example of materials or products</th>
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<tbody>
<tr>
<td>1+</td>
<td>Cement; Reinforcing steels</td>
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<tr>
<td>1</td>
<td>Timber/ steel frame buildings; concrete frame buildings</td>
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<tr>
<td>2+</td>
<td>Pre-cast concrete products; Structural timber roof members</td>
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<tr>
<td>2</td>
<td>Building limes</td>
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<td>3</td>
<td>Damp proof courses</td>
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<td>4</td>
<td>Sanitary products</td>
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**System 1 (1+)**
- 3rd party certification of product and factory production control (FPC) (1+ with audit testing)
- Manufacturer declares product conforms
- 3rd party certification of FPC
- Own Initial Type Test (2+ with continuous surveillance)
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 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
### Annex ZA - Compulsory Informative Annex

**Part 1 - Clauses addressing essential characteristics**

<table>
<thead>
<tr>
<th>Requirement /Characteristic from the Mandate</th>
<th>Requirement Clause(s) in this or other European standards</th>
<th>Mandated levels and/or classes</th>
<th>Notes:</th>
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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'

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

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

Factory Production Control
A simplified example:
Structural performance - floor deflections

Insurance: Warranty, guarantees

Regulatory compliance

Performance ambition

‘Structurally safe’

How, defined in supporting standards

NHBC standard
Deflection < 0.003xspan
<12mm

Requirement met if:
Design (Eurocode) or test evidence
Deflection < L/250
Vibrations <8Hz

Ambition - low vibration floor
Deflection < L/180
Vibrations <8Hz
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-conditionning) 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!