Harmonized European standards for construction in Egypt

Advantages of Eurocodes for the Standards and Regulatory System

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Comprehensive & integrated

- Comprehensive design structural integrity for:
  - Buildings;
  - Civil engineering works such as bridges, silos, tanks, pipelines, towers and masts;
  - Temporary structures e.g. London Eye
  - Fire safety of structures;

- Compliant with Construction Products Directive Essential Requirements 1, 2 and 4.
- Specialist constructions e.g. nuclear power stations and dams may require additional provisions to Eurocodes

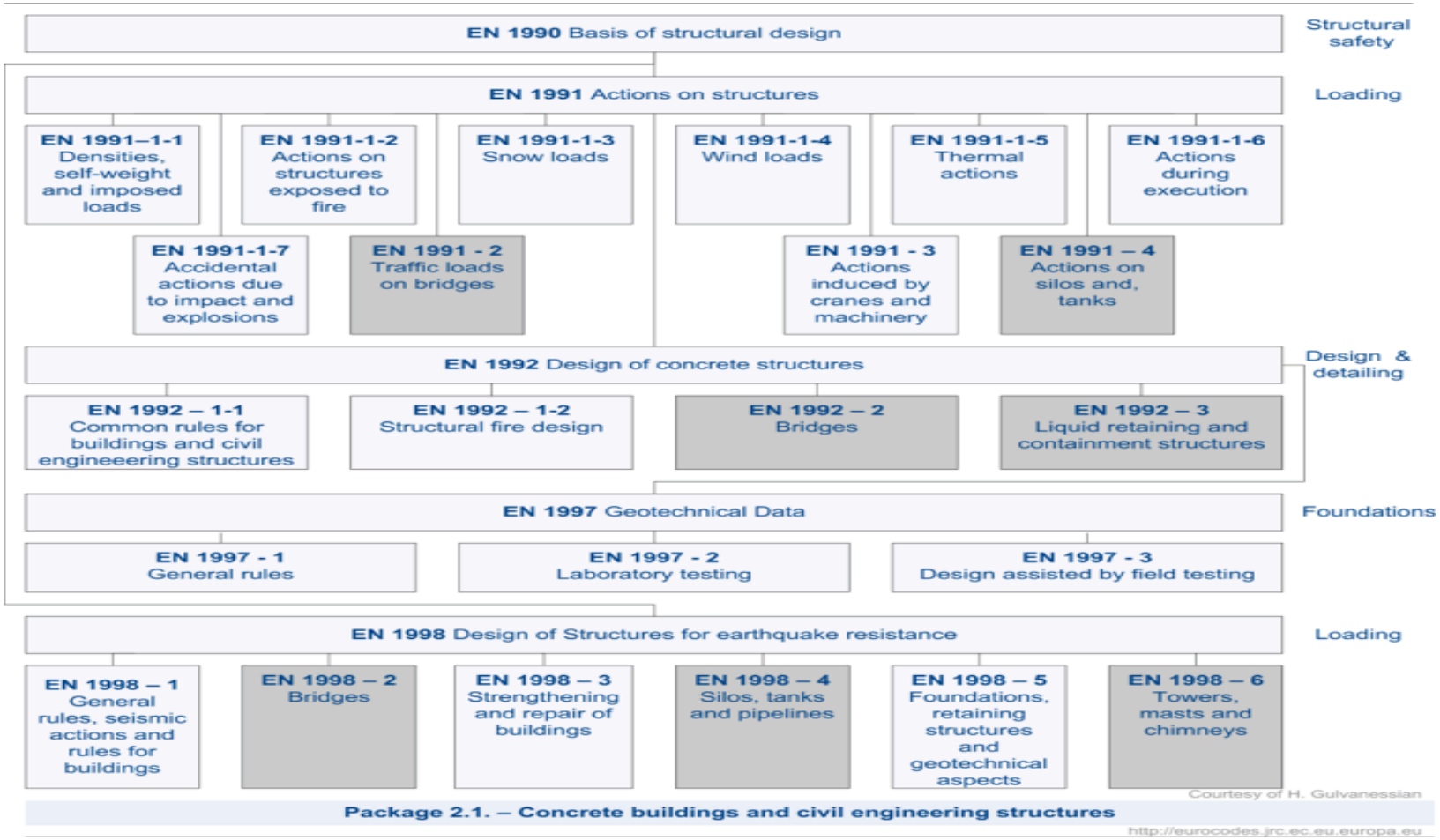
Comprehensive & integrated: 58 parts

- All 58 parts are integrated using a common vocabulary, thus minimising risk of misunderstanding among designers, approval authorities (building control in UK), insurance sector, academics and students, materials and product manufacturers, contractors and clients;
- National standards withdrawn and replaced by Eurocodes throughout EEA – common standards across Europe;
- 58 design codes covering:
  - Basis of design, actions/loadings, geotechnic, earthquake resistance;
  - All materials: concrete, steel, composites, timber, masonry and aluminium.

Comprehensive & integrated: Eurocodes Packages

- 2/1 Design of concrete building and civil engineering structures (excluding bridges and liquid retaining and containment structures)
- 2/2 Design of concrete bridges
- 2/3 Design of concrete liquid-retaining and containment structures
- 3/1 Design of steel building and civil engineering structures (excluding bridges, silos, tanks and pipelines, steel piling, crane supporting structures, and towers and masts)
- 3/2 Design of steel bridges
- 3/3 Design of steel silos, tanks and pipelines
- 3/4 Design of steel piling
- 3/5 Design of steel crane-supporting structures
- 3/6 Design of steel towers and masts
- 4/1 Design of composite steel and concrete building and civil engineering structures (excluding bridges)
- 4/2 Design of composite steel and concrete bridges
- 5/1 Design of timber buildings and civil engineering structures (excluding bridges)
- 5/2 Design of timber bridges
- 6 Design of masonry building and civil engineering structures (excluding bridges)
- 9 Design of all aluminium structures

Comprehensive & integrated: Typical Package



Comprehensive & integrated: Requirements

- In addition structural design requires:
  - **Materials standards** e.g. Concrete EN 206-1, Structural steel EN 10025;
  - **Products standards** mandated under Construction Products Directive. Some products designed using Eurocodes or performance evaluated by test standards leading to CE marking;
  - Typical product standards: Bearings EN 1337, Pre-cast concrete products EN 1168; reinforcing steel bars (rebar) EN 10080; masonry units EN 771;
  - **European Technical Approvals**: for innovative products e.g. Metal anchors, expansion joints, post-tensioning systems

Comprehensive & integrated: Execution

- Execution standards deal with workmanship, typical examples:
  - EN 1090 Execution of steel structures – Technical requirements
  - EN 1536 Execution of special geotechnical work – Bored piles
  - Sometimes published as part of Eurocode e.g. EN 1996-2
  - Sometimes as separate documents e.g. Concrete, steel, geotechnics etc

Comprehensive & integrated: National Annex

- National Annex required for designs:
  - Introduced to permit variation in soils, geography and climates across Europe;
  - Alternative safety factors if recommended are not considered appropriate;
  - Even permissible alternative procedures;
  - Application of informative annexes;
  - References to non-contradictory complementary information (NCCI).

Comprehensive & integrated: NCCI

- Non-contradictory complementary information (NCCI):
  - A complementary document/guide to assist designers with using the Eurocodes;
  - May be produced and published by national bodies other than National Standards Body;
  - Approved by the NSB and listed in National Annex.

Comprehensive & integrated: Summary

- Design requires:
  - Eurocodes – select a suitable package;
  - Material standards
  - Products standards/ European Technical Approvals
  - Test standards
  - Execution standards
  - National Annex
  - NCCI

State of the Art

- Harmonisation across Europe means best practice;
- Eurocodes have been developed by experts from across Europe;
- Most technically advanced in the world;
- Encourage innovation;
- Technical co-operation with ISO so that Europe and ISO work in harmony and avoid costly duplication;
- CEN/ISO work accepted and adopted by other;
- Being adopted outside Europe.

Guaranteed maintenance: revisions

- CEN TC250 responsibility;
- Delegated to each Sub-Committee to establish a Maintenance Group;
- Request can come from Member State/EC via the Eurocodes National Correspondents or direct from NSB;
- Eurocodes are EN standards, just like any other European standard;
- Subject to review and updating as per CEN rules and procedures;
- Revision, if any, to be accepted and adopted by EC, Member States and NSB.

Guaranteed maintenance: scope

- Scope:
  - Errors – may be addressed administratively;
  - Health and safety errors – urgent technical amendment;
  - Technical and editorial improvement – despite limited to 3 languages and cross-checking;
  - Interpretation;
  - Inconsistencies and misleading/misunderstood statements.

Minimise cost and risk

- Cheaper to maintain ONE set of standards at European level than 30+ national standards;
- EU's Joint Research Centre will provide technical support, liaise with national helpdesks and internationally;
- For technical updating underpinning research can be done collaboratively at centres of excellence e.g. JRC (EU/Italy);
- Up to date standards minimise risk – something not guaranteed by 30+ NSBs supporting national standards.

Adaptable to local needs

- Eurocodes are flexible recognising climatic and geographical and soils conditions;
- National annexes gives further freedoms;
- Execution standards reflect workmanship and local practices;
- Guidance by industry to aid application.

Supports and simplifies regulation

- Common tools for differing rules;
- National regulations can differ, but compliance via common standards;
- Construction Products Directive's Essential/Basic Works Requirements met:
  - ER1 Mechanical resistance and stability;
  - ER2 Safety in case of a fire;
  - ER4 Safety in use
- Work underway to show compliance with other ERs.

Supports and simplifies regulation: procurement

- Public procurement for buildings and civil engineering works to be specified using Eurocodes;
- Opens up bidding opportunities from across EEA and beyond making projects better value for money;
- Opens up opportunities worldwide where Eurocodes have been adopted/accepted
- Makes European construction sector – contractors and manufacturers - more competitive

Supports and simplifies regulation: CE Marking

- Facilitates Single/Internal Market by establishing a framework for harmonised technical specifications for construction products and their CE marking;
- CE marking shows compliance with:
  - Harmonised EN or ETA;
  - Appropriate attestation system;
  - May require third party/notified body for testing or certification;
  - Declaration by manufacturer taking responsibility for product

Supports and simplifies regulation: CPD

- CE marked products:
  - Enjoy access to all markets across Europe – a “passport”;
  - Does not guarantee acceptance due to differing national regulations and climate, geography etc;
- Construction Products Regulations being agreed:
  - Will change terminology from Essential Requirements to Basic Works Requirements (BWR);
  - Introduce new BWR: Sustainable use of natural resources;
  - Reduce one of the attestation systems (System 2);
  - Expected to be operational by 2013

Integration with Europe

- Subsidiarity permits Member States to set their own safety levels for the protection of its citizens;
- Harmonised building regulations not possible;
- However, basis for regulations e.g. Standards have been harmonised: common tools;
- Eurocodes provide harmonisation for ER1 Mechanical resistance and stability and ER4 for safety in use;
- Harmonisation of ER2: Safety in case of fire by fire classes and Eurocodes;
- Harmonisation of ER6: Energy Performance of Buildings Directive

Integration with Europe: CPD

- Construction Products **Directive** being revised to Construction Products **Regulations**;
- Will result in uniform implementation across EU;
- Will automatically be inserted into national legislation;
- No variation across Europe – a problem with Directive;
- Expected to be in place by 2013

Integration with Europe: guidance

- Guidance e.g. “BSI Structural Eurocodes Companion” to explain concepts and how to navigate with new standards;
- Worked examples being prepared by industry to facilitate Eurocodes;
- Guidance for selection of compliant construction products and materials being developed;
- Text books available and being developed;
- Software also available;
- E-learning being developed.

Integration with Europe: training

- University teaching notes being updated and next generation of engineers will benefit;
- Special publications such as Student Guides (at affordable prices);
- Training courses for all Eurocodes being run;
- Since Eurocodes are the same, opportunity to be trained in other countries, or training to originate from other countries

Challenges

- Recognised at outset that a new set of design standards would be difficult;
- Natural resistance from Member States/ NSB to give up their national codes;
- Decision taken for all to switch to new codes by 2010;
- All Member States will accept Eurocodes even though national legislation may not have been updated yet.
- Centralised Eurocodes Helpdesk established to link Eurocodes, CEN TC 250, NSB;

Help available

- Initially question should go to national help desk;
- Answers may be edited and posted on JRC website under FAQs;
- National helpdesk to advise how Eurocodes replace national standards in terms of design;
- Student guides being published by BSI;
- Similar guides being produced by engineering institutions, trade associations etc;
- Newsletters available from CEN TC250, NSBs, industry on latest developments;
- UK website set up by ICE http://www.eurocodes.co.uk
- http://eurocodes.jrc.ec.europa.eu
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