

**Steel Structures:  
Culture & Sustainability**  
Istanbul, 22 September 2010

**CE Marking for Structural Steelwork**

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to the

British Constructional Steelwork Association

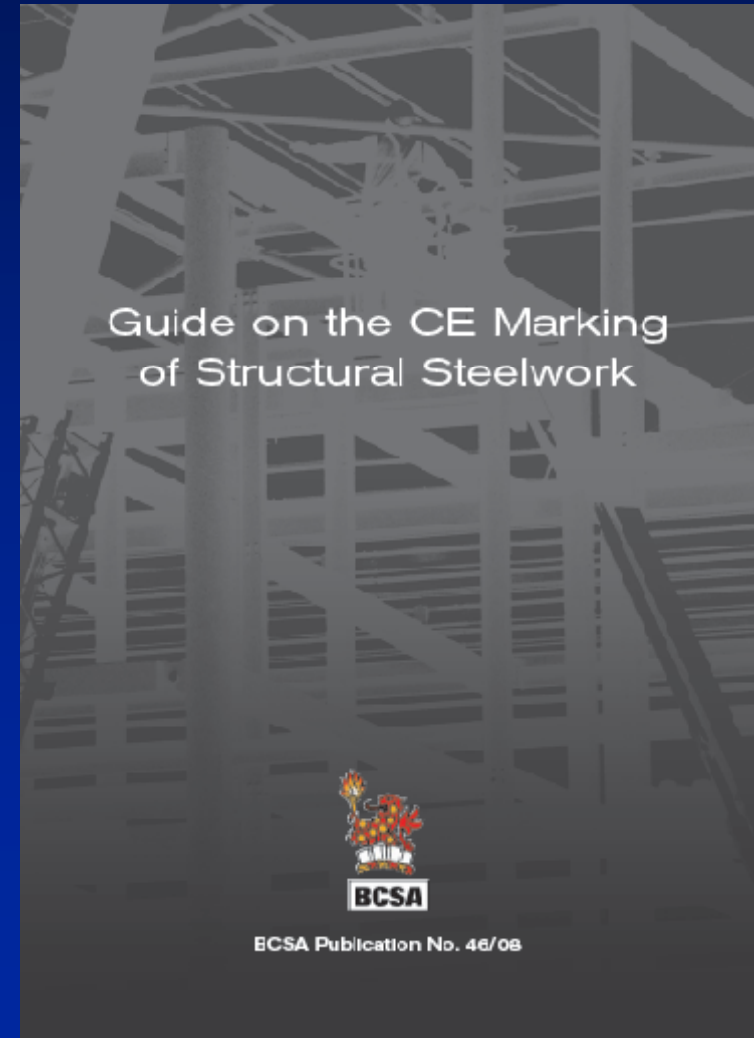
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# Introduction

- Basis
- Tasks
- Supply chain
- Welding
- Certification
- Implications

# Basis

- CE Marking is a manufacturer's legal declaration that the components meet certain public safety characteristics



# Harmonised standards

- EN 1090-1
  - Steel and aluminium structural components
  - Requirements for conformity assessment
  - “Harmonised” as Annex ZA included
- Already published and can be used for certification
- Cannot be used for CE Marking until listed in OJ
  - Will be listed in the EU Official Journal “soon”
- Then CE Marking mandatory in most of EU
  - Transition period of one year(?)
- New Construction Products Regulations in 2012

# Conformity assessment

- Initial type testing (ITT)
  - Manufacturer develops a “prototype” of what is to be manufactured and proves that it meets the performance characteristics specified in the standard
- Factory production control (FPC)
  - Manufacturer establishes methods for controlling regular production that ensure that products placed on the market are as good as the initial “prototype”

# Structural components

- Component specification is the “drawing”
- This is the key document as this defines all aspects of the “initial type”
- The development of the initial type is by a combination of design calculation and testing
- The “drawing” is then issued for manufacture
- EN 1090-2 is a supporting standard specifying the basis for quality control etc during manufacture

# Tasks

Tasks	
Manufacturer	Initial Type Testing/Calculation (ITT/ITC)
	Factory Production Control (FPC)
	Testing of samples taken at the factory
Notified Body	Initial inspection of factory and FPC
	Continuous surveillance

# Manufacturer's tasks

Characteristic	Evaluation/Testing
Tolerances	Inspection
Weldability	Constituent product certificates
Fracture toughness	Constituent product certificates
Load bearing capacity	Design to Eurocodes
Fatigue strength	Design to Eurocodes
Resistance to fire	Design to Eurocodes
Reaction to fire	Manufacture to EN1090-2
Dangerous substances	Manufacture to EN1090-2
Durability	Surface preparation to EN 1090-2



# Load bearing capacity

- Harmonised steel products
  - Tensile strength
  - Yield strength
  - Elongation
- Harmonised structural components
  - Structural characteristics
    - Load bearing capacity (strength/serviceability)
    - Fatigue strength
    - Resistance to fire
- Design codes used to link these two systems
  - Eurocodes based on a “suite” of initial type tests

# Design control

- Design control is part of FPC if the manufacturer declares structural characteristics as design values
- The NB is not required to verify:
  - The design itself, or
  - That the component specification complies with the design brief
- The NB is required to certify:
  - That suitable design control procedures are in place
  - Using suitable equipment, computer programmes, codes
  - Using competent people

# Constituent products

- Mostly supplied with CE Marking
  - Steel products – EN 10025, EN 10210, EN 10219
  - Fasteners – EN 14399, EN 15048
  - Welding consumables – EN 13479
- Manufacturer can establish performance characteristics by test or re-test of supplied materials
  - Using certified laboratory (ISO 17025), or
  - As part of manufacturer's own FPC
- Traceability requirements in EN 1090-2

# Welding

- Welding is a “special process”
- ITT
  - Welding procedure qualification record (WPQR)
  - Defines range of application as a “family”
- FPC
  - Welding quality management system (WQMS)
  - Reference to EN ISO 3834
  - Identity and competence of responsible welding coordinator (RWC)

# Essential parameters

- Changes to manufacturer's welding processes
  - New or changed essential facilities
  - Change of RWC
  - New welding processes, type of parent metal and the associated WPQR
  - New essential equipment
- Subcontracted work
  - Not restricted
  - NB will inspect subcontractor facilities if “essential”

# Manufacturer's Declaration

- EN 1090-1 identifies four methods for the manufacturer to declare that structural components meet the requirements

# Method 1

- For example: Manufacture of welded profiles
- No design required
- Fabrication based on manufacturer's component specification (eg drawing)
- Manufacturer declares:
  - Tolerances to EN 1090-2
  - Constituent product characteristics
  - Other information need for structural calculations (size and shape of component)

## Method 2

- For example: Series production of proprietary cold-formed sections (purlins/rails) with safe load tables
- Design values included/attached
- Manufacturer declares:
  - Tolerances to EN 1090-2
  - Constituent product characteristics
  - Design values (load bearing capacity etc)
- Design and product type testing must be based on the Eurocodes



## Method 3a

- For example: Subcontract manufacture of components to the client's drawings
- No design required
- Manufacture is based on client's component specification
- Manufacturer declares:
  - Product is in accordance with component specification
    - Constituent products used
    - Size, shape, tolerances of component

## Method 3b

- For example: Facility built to US standards
- Design is based on client's specification or the manufacturer's component specification to meet client's specific needs
- Manufacture is based on component specification to the above design (not necessarily to Eurocodes)
- Manufacturer declares:
  - Tolerances to EN 1090-2
  - Constituent product characteristics
  - Other information need for structural calculations (size and shape of component)

# Notified Body

- A Notified Body is a certification body notified to EU authorities by a national accreditation body
- Notified Body issues a Factory Production Control certificate which will include the following information:
  - Name and address of the Notified Body
  - The number of the Factory Production Control Certificate
  - Conditions and validity of the certificate
  - Name of and position held by the person empowered to sign the certificate

# Welding certificate

- This may be issued (or have been issued) separately or the information is included on the FPC certificate
- It identifies these “essential parameters”:
  - Scope and the applicable standards
  - Execution Classes (EXC1,2,3 or 4)
  - Welding processes (111, 114 etc)
  - Parent material (S275, S355 etc)
  - Responsible welding co-ordinator

# Declaration of Conformity

- Manufacturer prepares a Declaration of Conformity (DoC)
- The manufacturer cannot affix the CE Marking without having made this declaration first:
  - Name and address of the manufacturer and place of production
  - Description of the product (type, identification and use) and a copy of the information accompanying the CE Marking
  - Provisions to which the product conforms (ie CPD)
  - Particular conditions applicable to the use of the product
  - The number of the accompanying FPC certificate
  - Name and position held by the person empowered to sign the declaration

# CE Marking

- The CE Marking may be located in the following places:
  - On the product
  - On the packaging
  - In the manuals or other supporting commercial literature
- For structural steelwork:
  - Put CE Marking on the drawings
  - Unique mark on each component linking them to the relevant drawing/s

# CE Marking

The CE Marking must include the CE Marking symbol together with the following information:

- Identification of the Notified Body for the FPC
- Name or identification number and registered address of the manufacturer
- The last two digits of the year in which the marking is affixed
- Number of the EC factory production control certificate
- Reference to EN 1090-1
- Description of the component; generic name, materials, dimensions and intended use
- Information on the relevant essential characteristics
- 'No performance determined' for characteristics where this is relevant
- The Execution Class of the component referring to EN 1090-2



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**EN 1090-1**

Welded steel beam – M 346

**Tolerances on geometrical data:** EN 1090-2, tolerance class 1. The requirements in Annex L2 apply.

**Weldability:** Steel S235J0 according to EN 10025-2.

**Fracture toughness:** 27 J at 0°C.

**Reaction to fire:** Material classified: Class A1.

**Release of cadmium 6:** No release.

**Emission of radioactivity:** No emission.

**Durability:** Surface preparation according to EN 1090-2, preparation grade P3. Surface painted according to EN ISO 12944.

**Structural characteristics:**

**Design:** NPD

**Manufacturing:** ~~Described in attached component specification with manufacturing a~~ According to **component specification and** EN 1090-2, execution class EXC 2.

CE conformity marking, consisting of the “CE”-symbol given in Directive 93/68/EEC.

Identification number of the ~~certification~~ notified body

Name or identifying mark and registered address of the producer

Last two digits of the year in which the marking was affixed

Certificate number

No. of European standard

Description of product

and

information on regulated characteristics



# Implications

- Manufacturers can have FPC certified now by “pre-notified” certification bodies
  - But they cannot undertake CE Marking yet
- Once EN 1090-1 is listed in OJ then CE Marking can commence
- The new Construction Products Regulations include a Basic Works Requirement related to “sustainability”
- Harmonised standards will be developed to support this extension
  - For example: Environmental Product Declarations

Guide on the CE Marking  
of Structural Steelwork

Thank you



BCSA Publication No. 46/08