

The Structural Eurocodes

*'The Eurocodes will become the Europe wide means of designing Civil and Structural engineering works and so ... they are of vital importance to both the design and Construction sectors of the Civil and Building Industries.'*¹

1.1 The Structural Eurocode programme

The Structural Eurocodes are a suite of ten standards for the design of buildings and civil engineering works, as illustrated in **Figure 3** and **Plate 2** (in the book's colour section). These standards are divided into fifty-eight parts and are accompanied by National Annexes issued by the various European countries that have introduced the Eurocodes into their design practice.

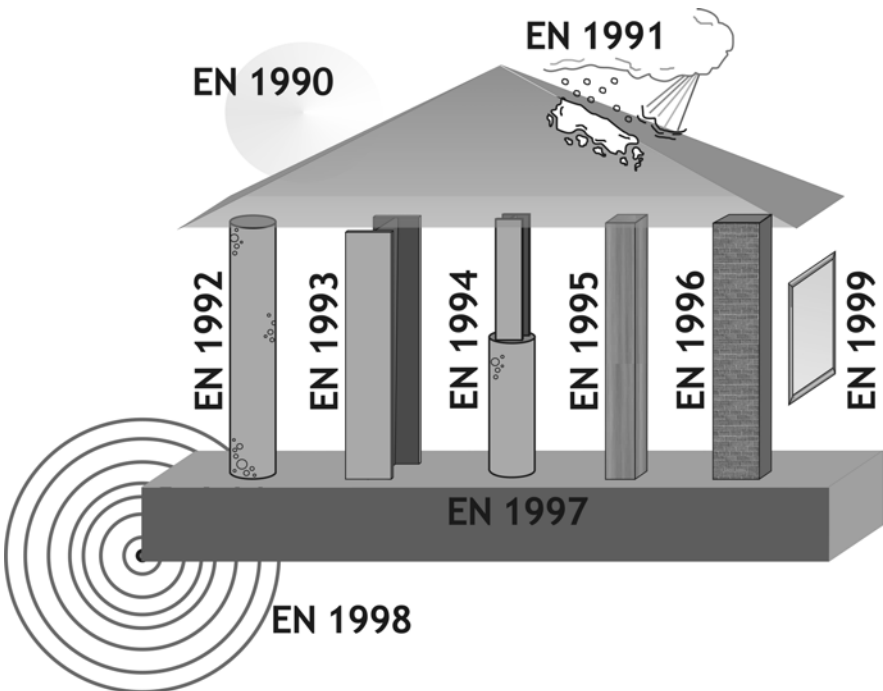


Figure 3. Standards within the Structural Eurocodes programme. See **Plate 2** for colour version

Outside and above the building in **Figure 3** are ENs 1990 and 1991, key aspects of which are discussed in **Chapter 2, Basis of structural design**.

Eurocode – Basis of structural design (EN 1990) establishes principles and requirements for the safety, serviceability, and durability of structures; describes the basis for their design and verification; and gives guidelines for related aspects of structural reliability. This code – occasionally and mistakenly referred to as ‘Eurocode 0’ – explains the fundamental engineering approach that underlies the entire suite of Eurocodes.²

Eurocode 1 – Actions on structures (EN 1991) gives design guidance and actions for the structural design of buildings and civil engineering works, including some geotechnical aspects. It is divided into four parts, with Part 1 further divided into seven sub-parts.³

The pillars of the building in **Figure 3** are the ‘resistance’ codes (ENs 1992 to 1996 and 1999), each of which provides detailed rules for the design of structures built in a particular material type.

Eurocode 2 – Design of concrete structures (EN 1992) covers the design of buildings and civil engineering works in plain, reinforced, and prestressed concrete. It is divided into three parts, with Part 1 further divided into two sub-parts.⁴

Eurocode 3 – Design of steel structures (EN 1993) covers the design of buildings and civil engineering works in steel. It is divided into six parts, with Parts 1, 3, and 4 further divided into twelve, two, and three sub-parts, respectively (for a total of twenty documents).⁵

Eurocode 4 – Design of composite steel and concrete structures (EN 1994) covers the design of composite structures and members for buildings and civil engineering works. It is divided into two parts, with Part 1 further divided into two sub-parts.⁶

Eurocode 5 – Design of timber structures (EN 1995) covers the design of buildings and civil engineering works in solid, sawn, planed, pole, or glue-laminated timber or in wood-based structural products or panels joined with adhesives or mechanical fasteners. It is divided into two parts, with Part 1 further divided into two sub-parts.⁷

Eurocode 6 – Design of masonry structures (EN 1996) covers the design of composite structures and members for buildings and civil engineering works. It is divided into three parts, with Part 1 further divided into two sub-

parts.⁸

Eurocode 9 – Design of aluminium structures (EN 1999) covers the design of buildings and civil and structural engineering works in aluminium. It is published in one part which is divided into five sub-parts.⁹

Finally, supporting the building in **Figure 3** are Eurocodes 7 and 8.

Eurocode 7 – Geotechnical design (EN 1997) covers geotechnical aspects of the design of buildings and civil engineering works. It is divided into two parts (with no sub-parts).¹⁰

Eurocode 8 – Design of structures for earthquake resistance (EN 1998) covers the design and construction of buildings and civil engineering works in seismic regions. It is divided into six parts (with no sub-parts). EN 1998 provides additional rules for design that supplement those given in the resistance codes for concrete, steel, and other materials.¹¹

Thus, there are a total of 58 parts and sub-parts that constitute the ten European standards in the EN Eurocode suite.

1.1.1 Links between the Eurocodes

Figure 4 and **Plate 3** (in the colour section) show the connections between the main parts of the Structural Eurocodes (in the style of the London Underground tube map). Only the main parts (not the sub-parts) of the Eurocodes are shown.

Along the 'Central Line' (in red on **Plate 3**) are the ten parts (Parts 1) giving general rules and rules for buildings. For example, EN 1992-1 provides general rules for concrete structures.

Around the 'Circle Line' (in yellow on **Plate 3**) are the six parts (Parts 2) giving rules for bridges. For example, EN 1992-2 provides design and detailing rules for concrete bridges.

The dashed line running north to south links ENs 1992-3 and 1993-3, which deal with liquid retaining and containing structures; the grey line running west to east beneath the Central Line links ENs 1991-4, 1993-4, and 1998-4, which cover silos and tanks; and the dashed lines in the south-east quadrant link ENs 1993-5, 1997-1 and -2, and 1998-5, which are concerned with foundations.

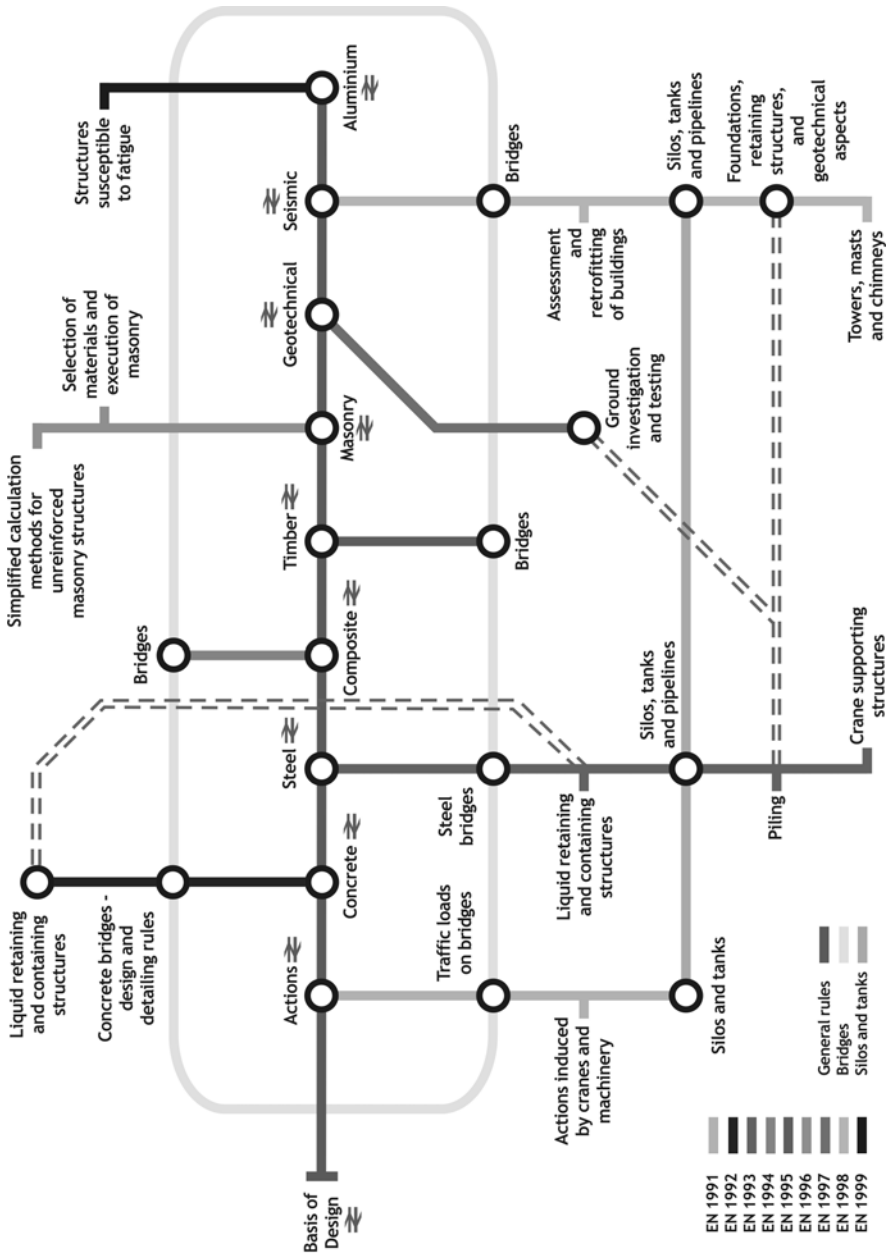


Figure 4. Connections between the main parts of the Structural Eurocodes (in the style of the London Underground tube map ©Transport for London). See **Plate 3** for colour version.