Country report: Turkey

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Standardization and Code Development in Turkey

- **Turkish Standardization Institute (TSE)** is the sole authorized body for standardization in Turkey. TSE is a member of ISO/IEC since 1956 and of CEN/CENELEC since 2012.

- In accordance with terms of CEN membership, TSE adopts European Standards. If required, European standards are translated in Turkish. TSE established a professional department; translation committee, for this work. This committee uses CAT (computer-assisted translation) tools.

- As the main authority, **The Ministry of Environment and Urbanisation (MoEU)** is responsible for Construction Products Regulation (CPR 305/2011) and also manages the national policy for some design and construction codes, specifications etc.
Standardization in Turkey

Nearly 37,000 standards in total

Standards in Turkey

- National standards (e.g. TS 500) are developed by technical committees in TSE and drafts are sent to stakeholders for their comments.

- International standards (e.g. TS EN 1990) are developed by ISO/IEC or CEN/CENELEC committees and Turkey follows and joins their work with national mirror technical committees.
National Mirror Technical Committees

129 national mirror technical committees (more than 1800 experts)
e.g. MTC 110 >> CEN TC/250 Structural Eurocodes

Turkey in International Committees

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Current status of Eurocodes in Turkey

• 100% of Eurocodes are adapted.

• 44% of Eurocodes are translated in Turkish.

• EN 1992-4 has recently been published by CEN. It is on work programme of TSE for adoption. It is translated in Turkish. Turkish version is ready now.

• 1 National Annex: EN 1993-1-1
Influence of Eurocodes to the Turkish design practice and codes

- The construction engineering practices in Turkey is largely governed by the provisions in the Turkish Building Earthquake Code (TBEC).

- TBEC had its latest version approved and published in March 2018 and will be in force after 1st of January 2019.
- Almost 120 experts contributed to the whole document and all activities were coordinated by a code committee consisting of 15 members. The new TBEC is a comprehensive revision of the previous one dated 2007.
- TBEC is not a standard, but a design code. In Turkey standards are voluntary documents, unless the authority having jurisdiction put them into force.
TBEC - 2019

• The new code consists of 17 chapters. Most of them are revised where there are new chapters on high-rise, seismically isolated, cold-formed steel and wooden buildings within the code.

• Some parts of the Eurocodes are incorporated to TBEC. Especially new parts have benefited from Eurocodes.
TBEC - Chapter 1: Basis of design

In the case of using testing as a tool for design, material and product properties shall be determined according to EN 1990 Annex D.

EN 1990:2002 (E)

Annex D
(informative)
Design assisted by testing

D1 Scope and field of application

(1) This annex provides guidance on 3.4, 4.2 and 5.2.

(2) This annex is not intended to replace acceptance rules given in harmonised European product specifications, other product specifications or execution standards.
TBEC- Chapter 7: Design of reinforced concrete structures

If the concrete strength class is C50 and above, use EN 1992-1 modelling approach.

TS 500: Standard for reinforced concrete structures

\[ \lambda = 0.8 \quad \text{for } f_{ck} \leq 50 \text{ MPa} \]
\[ \lambda = 0.8 - (f_{ck} - 50)/400 \quad \text{for } 50 < f_{ck} \leq 90 \text{ MPa} \]
and
\[ \eta = 1.0 \quad \text{for } f_{ck} \leq 50 \text{ MPa} \]
\[ \eta = 1.0 - (f_{ck} - 50)/200 \quad \text{for } 50 < f_{ck} \leq 90 \text{ MPa} \]

Note: If the width of the compression zone decreases in the direction of the extreme compression fibre, the value \( \eta f_{ck} \) should be reduced by 10%.

Figure 3.5: Rectangular stress distribution
TBEC- Chapter 10: Design of steel structures - cold-formed members and sheeting

Use EN 1993-1-3 approach for some design aspects referring to subsection «5.5 Local and distortional buckling»
TBEC - Chapter 12: Design of wooden structures

The chapter requires to follow EN 1995 for most of design aspects and gives some special provisions for sheet type bearing walls.
TBEC - Chapter 11: Design of masonry structures

- The chapter is mostly based on EN 1996-1 and may be traced as non-contradictory complementary information.
- Two new systems are introduced which are not in practice in Turkey: Confined masonry & reinforced masonry
TBEC- Chapter 14: Design of seismically isolated structures
The chapter gives design rules and requires prototype and acceptance tests for anti-seismic devices according to EN 15129

**Practice:** In high seismic regions, publicly owned hospitals with bed capacity more than 100 are required to be built with isolating devices since 2013. Now there are nearly 60 buildings.

TBEC- Chapter 15: Design of high-rise buildings

**Practice:** For both type of buildings «peer review» is required. It is a new tool for Turkish practice.
TBEC- Chapter 16: Foundations and geotechnical design

- The chapter introduces ultimate limit state design based on EN 1997.
- ULSD is not a common method among engineers in Turkey.
New code for design of steel structures

• A new code was published in February 2016 and now in force.
• It is based on ANSI/AISC 360-10 (Specification for Structural Steel Buildings) and not compatible with EN 1993.
• However it makes some references to EN 1991 (Loads) and fully follows EN 1090 (Execution).
• It gives two alternatives to the designer:
  - Load and Resistance Factor Design (LRFD)
  - Allowable Strength Design (ASD)
• ASD is the design method historically used in Turkey, and it is concluded by the committee that a transition period is needed to adopt LRFD.
Last words

• There are some other issues that Eurocodes are taken as reference document through TBEC or at least checked for compatibility.

• It is believed that engineers in Turkey will become more familiar with Eurocodes while using TBEC.
Thank you for your attention!

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Stay in touch

http://eurocodes.jrc.ec.europa.eu/