European Commission

The National standardization and Current status of Eurocodes in Turkey

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Outline

- *Construction sector in Turkey*
- *National standardisation system*
- *Regulations and current codes*
- *Current status and ongoing code development initiatives*
- *Use of Eurocodes in Turkey*
- *Education and Training on Eurocodes*

Costruction sector in Turkey

- *Building sector is one of the leading sectors of Turkish economy*
- *Turkish contractors have achieved a volume of work exceeding **US$ 26,1 billion in 2012 in 43 foreign countries** spread over four continents.*
- *Turkey is a major producer of basic building materials and especially strong and competitive in producing building steel, cement, ceramic and glass products.*

Country	Total ERMCO Members *millions of m^3*			Total rmc country *millions of m^3*			Production per capita *m^3/capita*		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
Austria	9,3	9,2	9,5	10,3	10,2	10,5	1,238	1,221	1,254
Belgium	6,0	6,5	7,6	10,4	10,8	11,6	0,975	1,004	1,070
Czech Republic	5,7	5,0	5,8	7,3	6,4	7,5	0,703	0,611	0,714
Denmark	1,6	1,5	1,8	1,8	1,7	2,1	0,329	0,308	0,379
Finland	1,9	2,3	2,7	2,0	2,6	3,0	0,377	0,488	0,561
France	29,7	29,8	33,1	37,0	37,4	41,3	0,578	0,581	0,638
Germany[2]	24,8	24,3	25,7	37,7	42,0	48,0	0,459	0,513	0,587
Ireland	2,8	2,2	2,0	3,8	2,7	2,4	0,863	0,607	0,537
Italy	22,0	19,0	17,8	58,8	54,4	51,8	0,986	0,906	0,858
Netherlands	6,7	4,9	6,8	9,3	8,1	8,8	0,567	0,491	0,531
Poland	7,2	7,6	9,7	17,7	18,6	23,7	0,463	0,488	0,621
Portugal	6,7	6,0	5,0	8,5	7,5	6,1	0,801	0,706	0,573
Slovakia	1,7	1,4	1,4	2,6	2,4	2,3	0,481	0,443	0,429
Spain	39,9	31,2	23,8	49,0	39,1	30,8	1,081	0,853	0,669
Sweden	2,3	2,7	2,9	2,8	3,3	3,3	0,305	0,357	0,353
United Kingdom	14,4	14,3	15,3	15,8	15,7	16,7	0,258	0,255	0,269
Total/Average EU	182,7	167,9	170,8	274,7	262,9	269,9	0,629	0,600	0,613
Israel	6,7	**7,5**	8,0	9,5	11,0	11,0	1,301	1,507	1,507
Norway	2,6	2,7	3,2	2,9	3,0	3,5	0,612	0,625	0,725
~~Switzerland~~	~~11,0~~	~~11,2~~	~~11,9~~	~~11,6~~	~~11,8~~	~~12,5~~	~~1,528~~	~~1,532~~	~~1,605~~
Turkey	40,0	47,5	54,0	66,4	79,7	90,0	0,941	1,114	1,240
~~Total/Average ERMCO~~	~~248,0~~	~~236,0~~	~~249,0~~	~~365,1~~	~~368,4~~	~~386,9~~	~~0,693~~	~~0,695~~	~~0,726~~
Russia	5,0	4,0	4,0	45,0	40,0	40,0	0,317	0,282	0,282
USA	**157,0**	118,0	120,0	**243,0**	197,0	203,0	**0,804**	**0,652**	**0,672**
Japan	77,0	75,0	77,0	86,0	85,0	88,0	0,676	0,668	0,691

New challanges

- *Urban Transformation Act (2012) came into force as a mean for earthquake mitigation in our country; and related legislation that introduced the concept of disaster management and risk reduction into the land use and development process. There are two possible applications,*

1. *Regional risk mitigation: The Ministry and municipalities are working now on more than **100 district areas** covering a population of 1 million.*
2. *Individual replacement of housing units: Citizens can replace their own buildings individually. Currently reconstruction of **52 thousand units** covering a population of around 200 thousands is in progress.*

- *Strategy: Within 20 years **more than 15 percent** of existing building stock will be transformed.*
- *Resource allocation: Replacement of building stocks, resettlement sites, voluntarily transfer from the risk-prone areas, different approaches in building permits, fees and taxes.*

Testing, certification and inspection in costruction sector

*As part of **implementing the final phase of the Customs Union (**Decision No 1/95) and after Decision 2006/654 Turkey shall notify conformity assessment bodies that is an instrument necessary for the elimination of technical barriers to trade in a particular product.*

The notifying authority, The Ministry of Environment and Urbanism (MoEU) have made full progress in publishing and implementing the regulations on Construction Products (CPD-CPR 305/2011) and also on Notified Bodies and Market Surveillance related to the different EU directives.

Turkey adopted legislation on the publication of technical specifications and national and EU technical approvals, on conformity verification systems and on reaction-to-fire aspects of construction products.

Structural Codes and Standards

- *In Turkey there are two types of technical standards: voluntary standards and compulsory codes (regulations, national provisions, etc.).*
- *All the standards are developed by the National Standardisation Body (***Turkish Standards Institution -** *TSE)*
- *Standards do not become legal requirements unless regulatory authority (the ministry) declares them as mandatory. In some cases standards can be "imposed" de facto by the ministry through specifications.*
- *On the other hand* ***Codes*** *are developed directly by relevant authorities engaged by law. Building codes in Turkey are generally concerned with health, safety, accessibility, protection of buildings from fire or structural damage, and energy conservation.*
- *There is a high degree of uniformity in building construction and fire safety across the country with centralized system for code development and maintenance.*

General view of current standards and background documents

Building Structures

Structural Concrete Design: TS 500/2000 (ACI 318, CEB-fib)

Structural Steel Design: TS 648/1980 (DIN 4114, SIA 161)

Masonary: TS 2510/1977

Aluminium

Timber

Loads TS 498/1987 (DIN 1055)

Earthquake code /TDY2007 (IBC/ASCE, Eurocode)

Geotechnics

Bridges

Technical Specification for Highway Bridges, General Directorate of Highways (AASHTO)

Standardisation

TSE became a full member of CEN in 2011.

Have duly integrated the necessity to withdraw the mandatory standards and to replace them by the corresponding TS ENs (transposal of European standards in Turkish) as the New Approach Directives come in force.

Priorities:

Withdrawl of the Turkish standards conflicting with the European standards

New EN standards under new approach directives

Amendments of European Standards/ Revised European standards under new approach directives

Current situation

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1990	BASE + buildings	ok		09.04.2009
EN 1990-A2	bridges			

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1991-1.1	ACTIONS I	ok		11.04.2006
EN 1991-1.2	fire	ok		13.04.2004
EN 1991-1.3	snow	ok		03.04.2007
EN 1991-1.4	wind	ok		06.12.2007
EN 1991-1.5	temp		y	28.01.2004
EN 1991-1.6	exec		y	27.12.2005
EN 1991-1.7	accid		y	12.10.2006
EN 1991-2	traffic		y	28.01.2004
EN 1991-3	crane		y	12.10.2006
EN 1991-4	silo		y	20.07.2006

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1998-1	EARTHQUAKE		y	12.06.2013
EN 1998-2	bridge		y	05.06.2012
EN 1998-3	repair		y	27.12.2005
EN 1998-4	silo_etc		y	12.10.2006
EN 1998-5	foundations	ok		13.03.2007
EN 1998-6	tower_etc		y	16.02.2006
EN 1997-1	GEOTECHNICS		y	27.12.2005
EN 1997-2	tests		y	31.01.2008

Current situation

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1992-1.1	CONCRETE gen.	ok		09.04.2009
EN 1992-1.2	fire	ok		30.11.2006
EN 1992-2	bridge		y	27.12.2005
EN 1992-3	tanks		y	21.12.2006

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1993-1. 1	STEEL general		y	27.12.2005
EN 1993-1. 2	fire	ok		03.04.2007
EN 1993-1. 3	gauge		y	27.03.2007
EN 1993-1. 4	stainless		y	27.03.2007
EN 1993-1. 5	plane		y	27.03.2007
EN 1993-1. 6	shell		y	05.06.2007
EN 1993-1. 7	plates		y	05.06.2007
EN 1993-1. 8	joints		y	27.12.2005
EN 1993-1. 9	fatigue		y	27.12.2005
EN 1993-1.10	quality		y	27.12.2005
EN 1993-1.11	cable		y	27.03.2007
EN 1993-1.12	HS		y	05.06.2007
EN 1993-2	bridge		y	27.03.2007
EN 1993-3.1	tower		y	27.03.2007
EN 1993-3.2	chimney		y	27.03.2007
EN 1993-4.1	silo		y	05.06.2007
EN 1993-4.2	tanks		y	05.06.2007
EN 1993-4.3	pipes		y	05.06.2007
EN 1993-5	piling		y	05.06.2007
EN 1993-6	crane		y	05.06.2007

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1994-1.1	COMPOSI	ok		12.04.2011
EN 1994-1.2	fire		y	27.12.2005
EN 1994-2	bridge		y	27.12.2005

Current situation

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1995-1.1	TIMBER gen.		y	27.12.2005
EN 1995-1.2	fire		y	27.12.2005
EN 1995-2	bridge		y	31.03.2005

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1996-1.1	MASONRY gen.		y	12.06.2013
EN 1996-1.2	fire		y	13.01.2011
EN 1996-2	material		y	30.03.2006
EN 1996-3	simple		y	30.03.2006

Name		Translated	Available in English ? (y/n)	Date of publication
EN 1999-1.1	ALUMINIUM gen.		y	03.07.2007
EN 1999-1.2	fire		y	03.07.2007
EN 1999-1.3	fatigue		y	31.01.2012
EN 1999-1.4	trapeze		y	03.07.2007
EN 1999-1.5	shell		y	03.07.2007

Past activities

EU MEDA project "Support to the Quality Infrastructure in Turkey"
Training in Eurocodes

June 13-17 2005

Ministry of Public Works & Settlement (formerly), Ankara

		Uzman: Prof. Calgaro	
I. AŞAMA	*1. Gün* *13.06.05*	*CPD (89/106/EEC) kapsamındaki Eurocode'un yorumlanması ve uygulanması* *CEN'de devam eden Eurocode çalışmaları ve en son gelişmeler (ve gelecekte Eurocode)* *Eurocode'lara ilişkin Ulusal Ek*	
		EN 1990:Yapısal Tasarımın Temelleri	
	2. Gün	*Eurocode 1:EN 1991 Yapıyla ilgili faaliyetler*	
	14.06.05	*Eurocode 2 EN 1992 Beton yapıların tasarımı* *1. Bölüm, Genel (EN 1992-1)* *2. Bölüm, Köprüler (EN 1992-2)*	
		Deprem Grubu	***Yangın Grubu***
		Uzman: Prof. Fardis	***Dr. Zhao***
II. AŞAMA	*3. Gün* *15.06.05*	*Eurocode 7 EN 1997 Jeo-teknik Tasarım*	*Yapısal Yangın Tasarımı* *Eurocode 2 Beton Yapılar (EN 1992-1.2)*
	4. Gün *16.06.05*	*Eurocode 8 EN 1998 Yapıların depreme dayanıklılığına ilişkin tasarım hükümleri*	*Yapısal Yangın Tasarımı* *Eurocode 3 Çelik Yapılar (EN 1992-1.2)* *Eurocode 5 Ahşap Yapılar (EN 1995-1.2)*
	5. Gün *17.06.05*	*Eurocode 8 EN 1998 Yapıların depreme dayanıklılığına ilişkin tasarım hükümleri*	*Yapısal Yangın Tasarımı* *Eurocode 4 Beton – Kompozit çelik ve beton yapıların tasarımı (EN 1994-1.2)* *Eurocode 9 Alüminyum alaşımlı yapıların tasarımı (EN 1999-1.2)*

Current Status in Turkey

- *Revisions of existing codes*
- *Development of new codes*
- *Ongoing work and future plans*

Existing Turkish codes/standards

- *TS500-February 2000 : Requirements for design and construction of reinforced concrete structures*
- *TS498-1987 (Nov. 1997): Design loads for buildings*
- *TS648-December 1980: Building Code for Steel Structures*
- *TEC 2007-March 2007: Specifications for Buildings to be built in seismic areas-Disaster and Emergency Management Presidency (AFAD)*

Code revision/development

- *Committee are formed by the responsible authority*
  - Academicians
  - Practicing engineers
  - Government representatives
- *Periodic committee meetings and a final workshop*
  - Feedback from all relevant organizations (governmental and non-governmental), engineering companies.
- *Official procedure to enact*

Current work in progress

- *TSE*
  - **Translation of EN's to Turkish by TSE**
- *Ministry of environment and Urbanization*
  - **Specifications for determination of high risk buildings under Urban renewal**
- *AFAD*
  - **Revision of parts of TEC 2007-AFAD**
  - **New parts for seismic code-AFAD**
- *KGM*
  - **Revision of Bridge Specification**

Revisions/Additions in progress

Revision and extension of TEC 2007

- **Revision of existing code**
  - General Rules
  - Seismic actions
  - Reinforced concrete buildings
  - Masonry buildings
  - Geotechnical aspects
  - Assessment and Rehabilitation
- **Addition of new parts**
  - Prefabricated buildings
  - Steel and Composite buildings
  - Wood buildings
  - Seismic isolation and damper
  - Tall buildings
  - Approximate procedures for simple buildings

Revision and extension of TEC 2007

Part	Intention to make EN compatible	National Annex/NDP
General	No	No
Seismic actions	No	No
Reinforced concrete buildings	No	No
Masonry buildings	Partially	No
Geotechnical aspects	Partially	No
Assessment/Rehabilitation	Partially	No
Prefabricated buildings	Partially	No
Steel and Composite buildings	Mostly	No
Wood buildings	Yes	No
Seismic isolation and damper	No	No
Tall buildings	No	No

Use of Eurocodes in Turkey

- *Not compulsory*
- *Can be used when no existing Turkish codes*
- *Used if specified in specific project calls*
- *Turkish translation for some EC are available*
- *Used along with Turkish codes*
  - **Approach in EC is employed**
  - **Local parameters are taken from Turkish codes i.e. Spectrum, loads etc.**

Training/Education of EC in Turkey

- *Some EC's are used in courses at Universities*
  - **EC 1990, EC 1991, EC 1993, EC 1994, EC 1998**
- *Rare training seminars*
  - **Chamber of Civil Engineers continuuing education seminars**
    -Practicing engineers
    -University Professors
  - **University seminars**
    -Inivited speakers from Europe
    -University Professors

Some conclusions - 1

- *The current Turkish structural codes are not based on a single source of codes (American, German, British Standards)*
- *Deficiencies in the structural codes and inconsistencies between the various standards, particularly deriving from their different reference bases, should be resolved.*
- *Turkey has currently "frozen" national standards (except earthquake) in structural design area.*
- *Harmonisation with international structural design practice should be improved.*

Some conclusions - 2

- *The main concern is the complexity of the Eurocode system as well as the Eurocodes (authorised simplifications).*
- *Designers are unlikely to adopt the structural Eurocodes until they see a competitive advantage.*
- *There is currently no experience with the Eurocodes (except top design offices) and it is not yet possible to assess the impact of the Eurocodes on the daily work of designers and contractors.*
- *Turkey is currently updating the earthquake code and this will benefit from the philosophy of Eurocodes.This might make a possible future transition to Eurocodes.*
- *There is a tendency for awaiting extensive implementation in Europe.*

Thank you

- *Participants*
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