European Commission

Elaboration of maps for climatic and seismic actions in the EU Member States – JRC NDPs DB

S. Dimova, L. Sousa, B. Nikolova, S. Iannaccone, A. Pinto

Outline

Eurocodes:

- Support to the implementation in EU and EFTA
- Harmonized use in EU and EFTA
- Further development
- New fields of design: adaptation to climate change
- International promotion and training

JRC support to policies and standards for construction

Work programme for Administrative Arrangements between DG JRC and DG GROW 2015-2017

Task	Subtasks
Eurocodes IT tools	NDPs DB, Eurocodes website, Helpdesk
Implementation and harmonized use	Statistical analysis of NDPs
	Reliability levels achieved (chosen NDPs)
	Training/dissemination of material
New fields of application	Adaptation to climate change
	Underground structures
Resource efficiency	Technical and research needs
	Best practices
Promotion of policies and standards for construction outside EU	Coordination and facilitation

European Commission

Support to the Eurocodes implementation

ELABORATION OF MAPS FOR CLIMATIC AND SEISMIC ACTIONS FOR STRUCTURAL DESIGN IN THE BALKAN REGION

27-28 October 2015, Zagreb

Implementation of the Eurocodes

2014/2015 enquiry by DG GROW and DG JRC

National Authorities

PART 1 - STATE OF IMPLEMENTATION OF EUROCODES IN THE EU MEMBER STATES

To be compiled by the relevant national authorities

Country:

Date: Compiled by:

EN Eurocodes parts	This EN part was or will be implemented in your country?	Amendment of relevant national regulations to allow the use of the Eurocodes		Is the use of the Eurocodes obligatory in your country?		Is the use of the Eurocodes restricted (e.g. additional requirements, calculations, certificates, etc.)?		Is there a regulatory framework in your country enforcing the use of the Eurocodes in public procurement?		Comments (experience, problems encountered, solutions found)
		Was it/is it necessary for the implementation	If yes, date (or envisaged date) of such amendment?	Is the use of this EN part obligatory in your country?	If yes, please provide title/reference of/to the regulation	Is the use of this EN part restricted?	If yes, which restrictions apply?	Framework for use of this EN part in public procurement	If yes, please provide title/reference of/to the regulation	
	(Yes/No)	(Yes/No)	(Month) [1] (Year)	(Yes/No)		(Yes/No)		(Yes/No)		
EN 1990 [2]	Please select	Please s								
EN 1990 – Annex A2	Please select	Please s								
EN 1991-1-1	Please select	Please s								
EN 1991-1-2	Please select	Please s								
EN 1991-1-3	Please select	Please s								

NSBs

PART 2 - STATE OF IMPLEMENTATION OF EUROCODE SIN THE EU MEMBER STATES

To be compiled by the national standardisation body

Country:

Date: Compiled by:

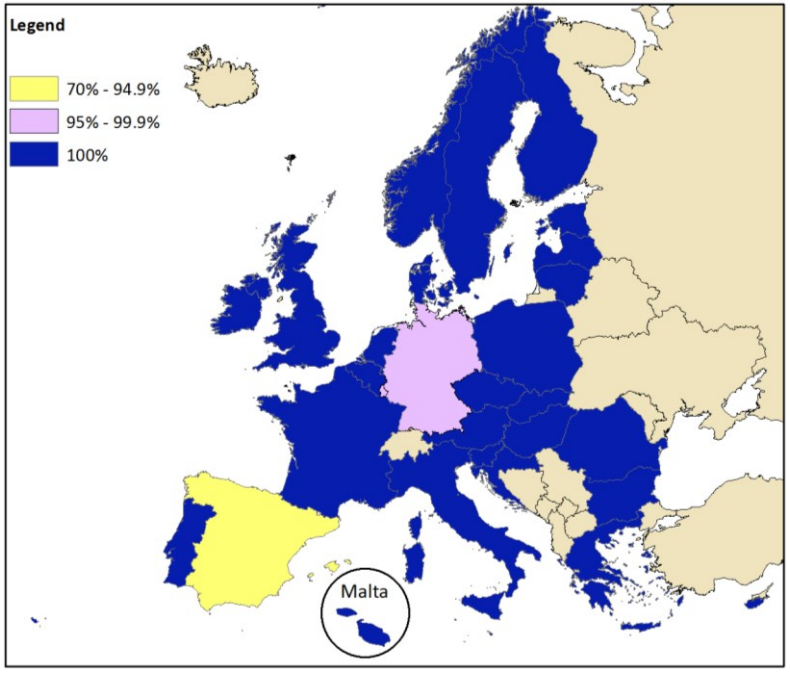
EN Eurocodes parts	This EN part was or will be implemented in your country?	Date of publication of the EN part as national standard		The EN part was completely translated in National language?	National Annexes			Is the use of this EN part obligatory in your country?	Is the use of the Eurocodes restricted (e.g. additional requirements, calculations, certificates, etc.)?			Are there national standards on structural design used in parallel with the Eurocodes?			Comments (experience, problems encountered, solutions found)
					Date of publication		Available in English?		Is the use of this EN part restricted?	If yes, which restrictions apply?	National standards used in parallel with this EN part?	If yes, please provide reference	If yes, what is their correspondence to this EN part?	
	(Yes/No)	(Month) [1]	(Year)	(Yes/No)	(Month) [1]	(Year)	(Yes/No)	(Yes/No)	(Yes/No)		(Yes/No)			
EN 1990 [2]	Please select			Please select			Please select	Please select	Please select		Please select			
EN 1990 – Annex A2	Please select			Please select			Please select	Please select	Please select		Please select			
EN 1991-1-1	Please select			Please select			Please select	Please select	Please select		Please select			
EN 1991-1-2	Please select			Please select			Please select	Please select	Please select		Please select			
EN 1991-1-3	Please select			Please select			Please select	Please select	Please select		Please select			
EN 1991-1-4	Please select			Please select			Please select	Please select	Please select		Please select			
EN 1991-1-5	Please select			Please select			Please select	Please select	Please select		Please select			
EN 1991-1-6	Please select			Please select			Please select	Please select	Please select		Please select			

Implementation of the Eurocodes

preliminary results, report by DG JRC and DG GROW to be published in 2015

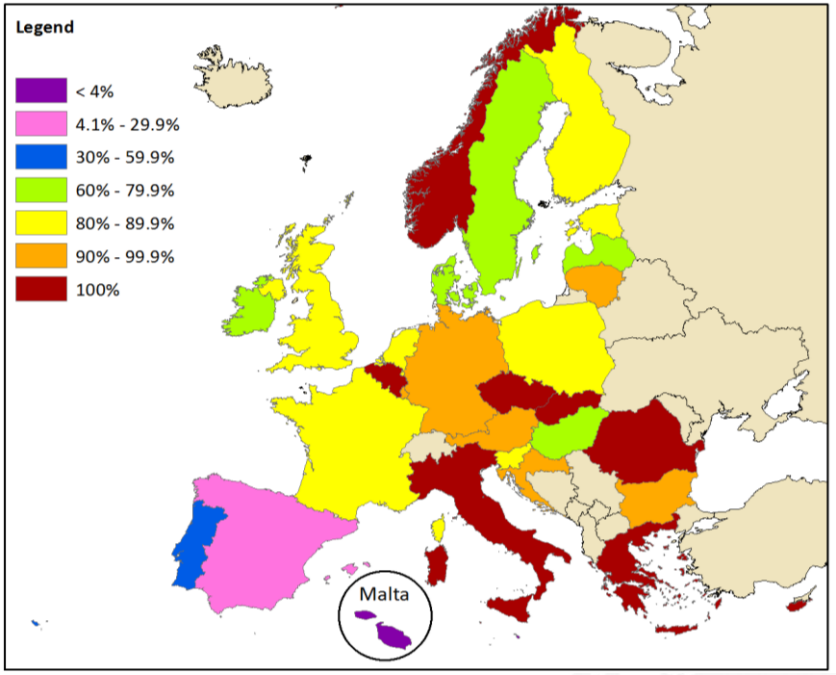
Publication of National Standards

Germany and Luxembourg did not publish 1 Part, Spain published 83%



Publication of National Annexes

90% of the countries published NAs to more than 70% of all Eurocodes Parts

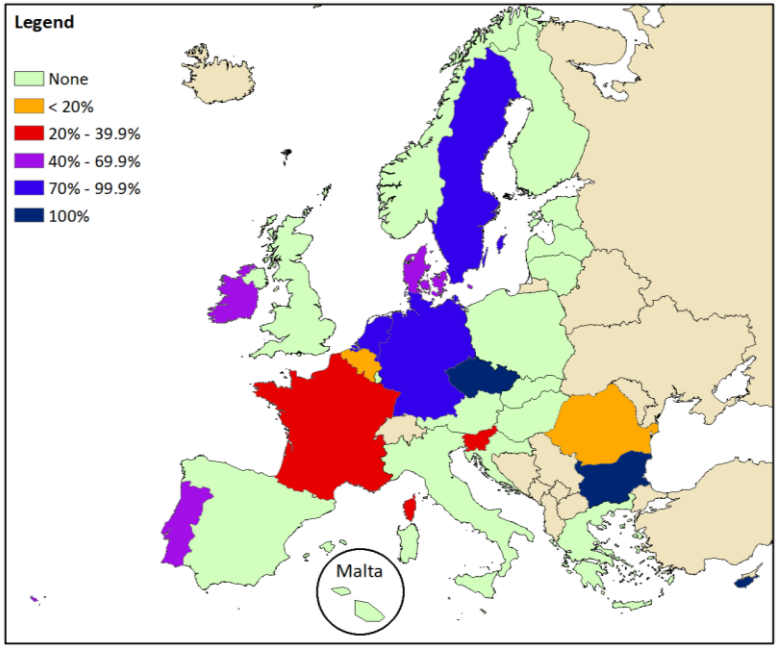


Implementation of the Eurocodes

preliminary results, report by DG JRC and DG GROW to be published in 2015

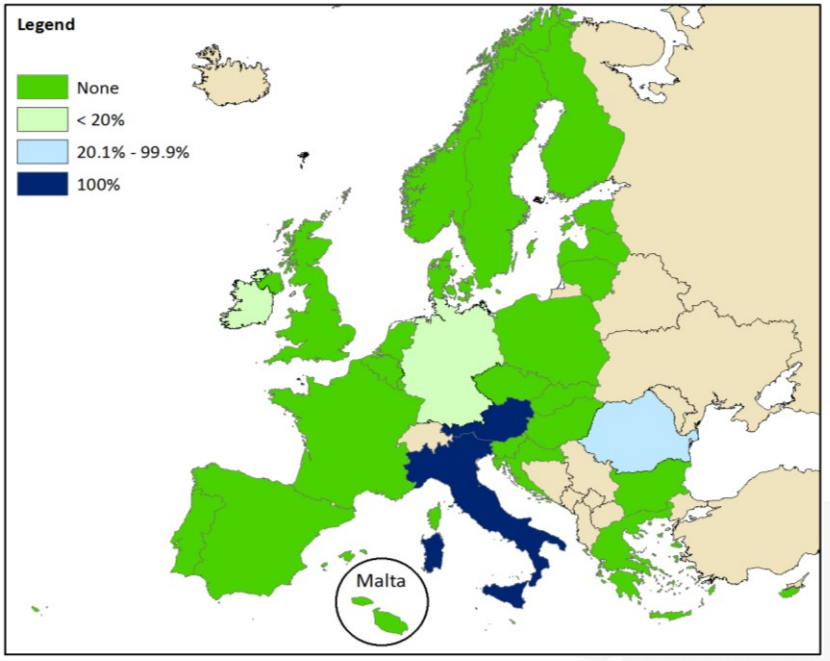
Obligatory use of Eurocodes Parts

In 55% of the countries none of the Parts is obligatory



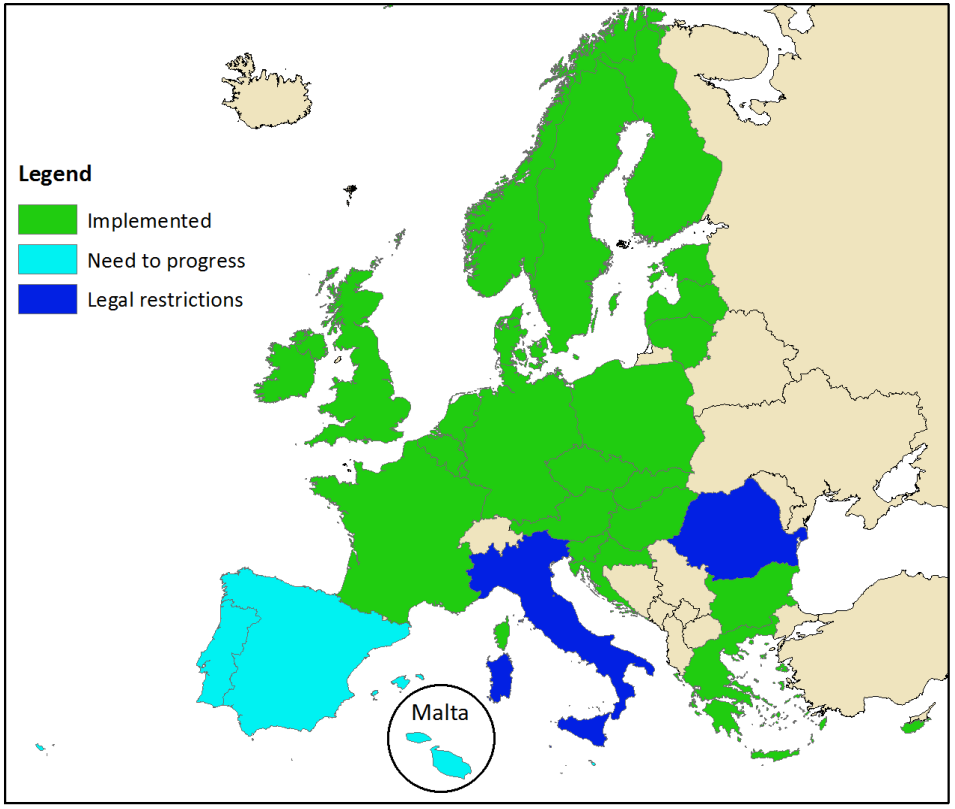
Restrictions to the use

In 80% of the countries – no restrictions



Implementation of the Eurocodes

preliminary results, report by DG JRC and DG GROW to be published in 2015



In 23 EU Member States and in Norway the **Eurocodes are implemented**.

There is **need of** a Commission **Recommendation on the regulatory environment** for use of the Eurocodes, to achieve their full implementation.

Practical implementation: structures designed to the Eurocodes

EUROCODES
BUILDING THE FUTURE

You are here: Homepage > Designing with the Eurocodes > Structures designed to EN Eurocodes

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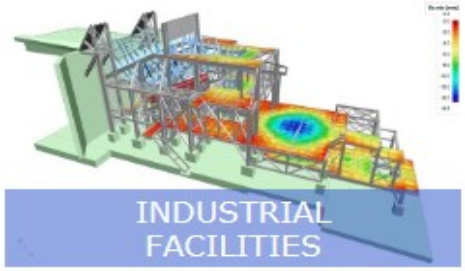
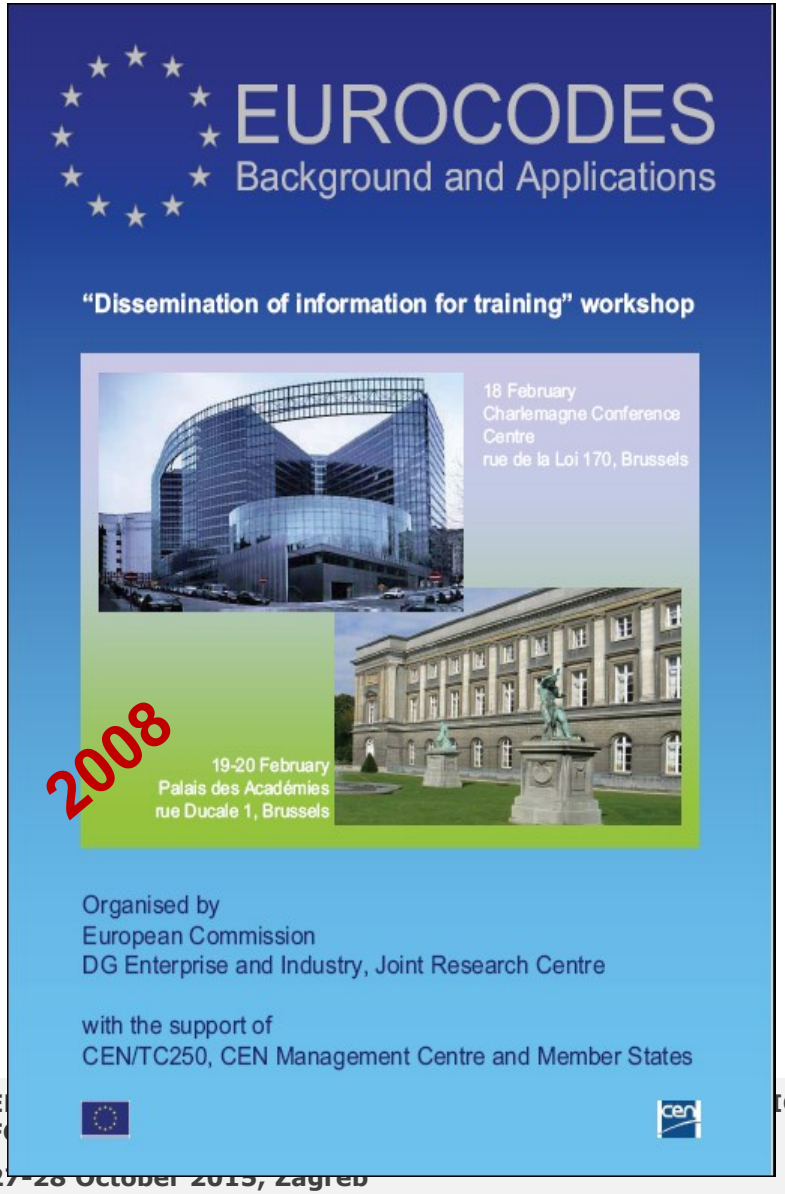
- Designing with the Eurocodes
  - EN Eurocodes & related standards
  - Structures designed to EN Eurocodes
    - Public buildings
    - High-rise buildings
    - Bridges
    - Industrial facilities
    - Houses
    - Spatial structures

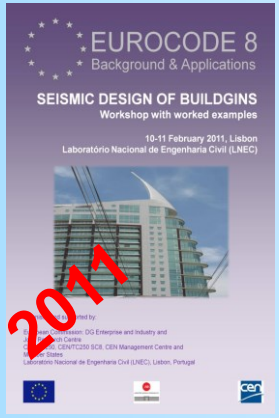
Structures designed to EN Eurocodes



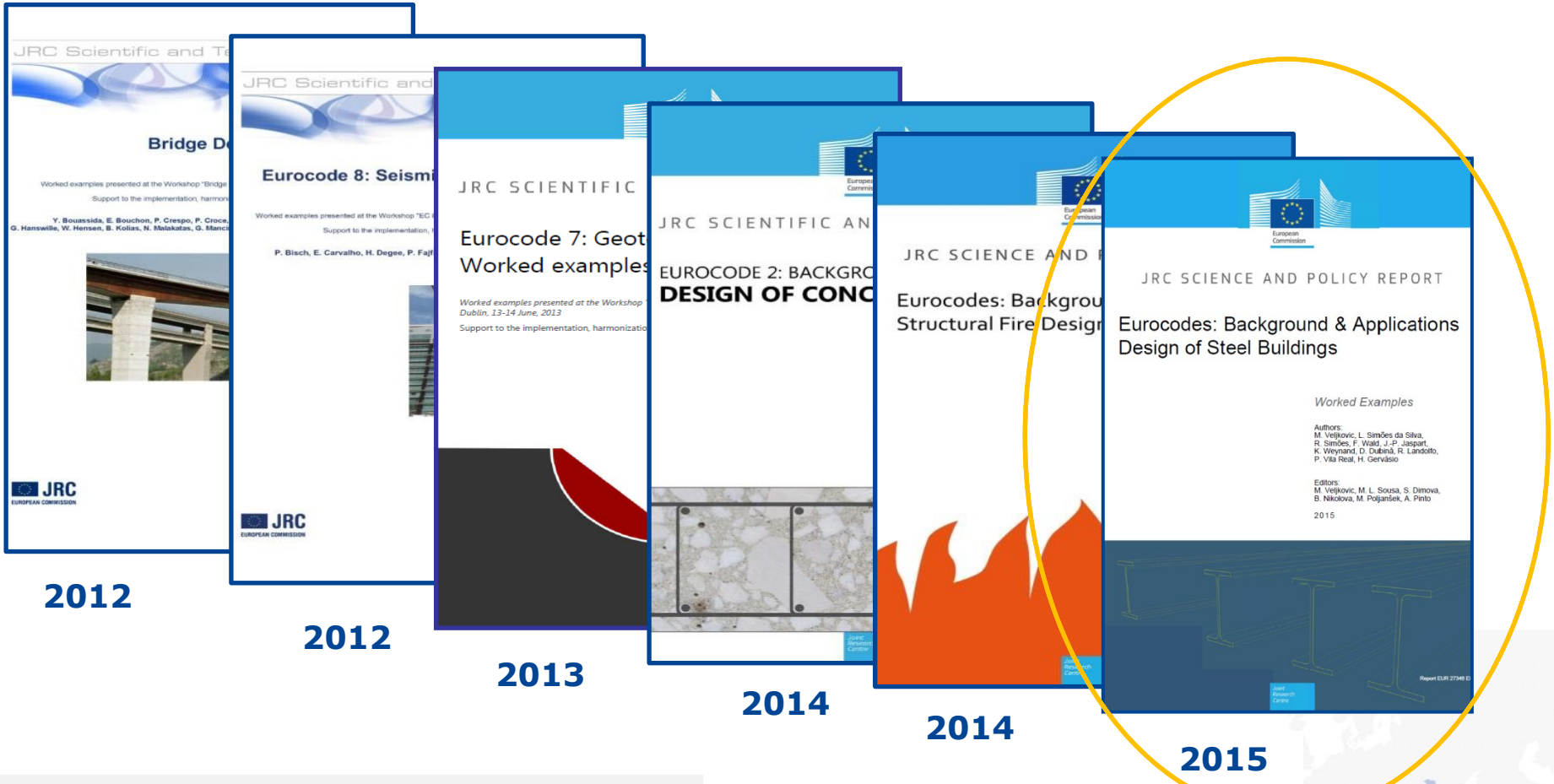
Eurocodes: Training and Promotion



With Worked Examples

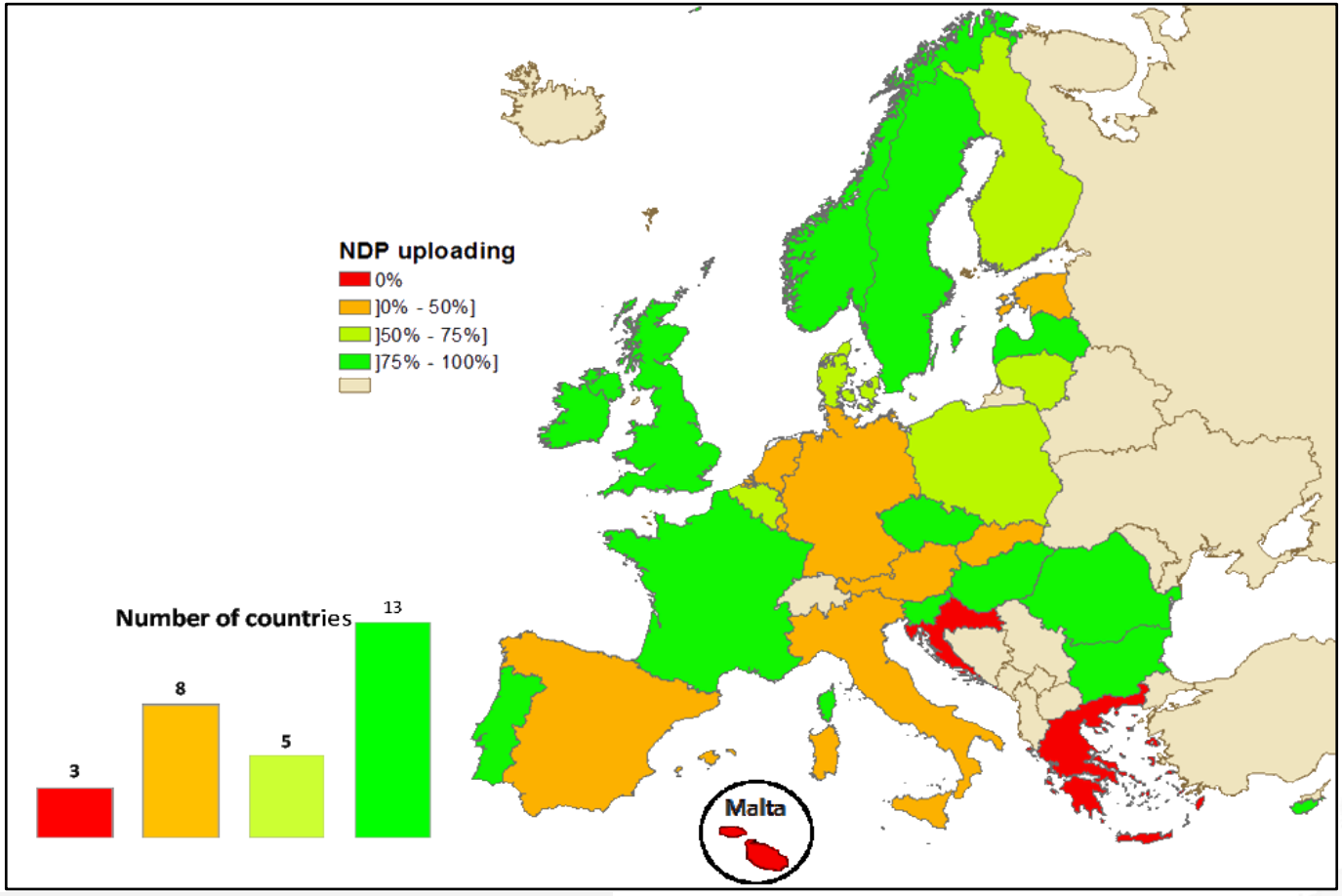


JRC reports with worked examples



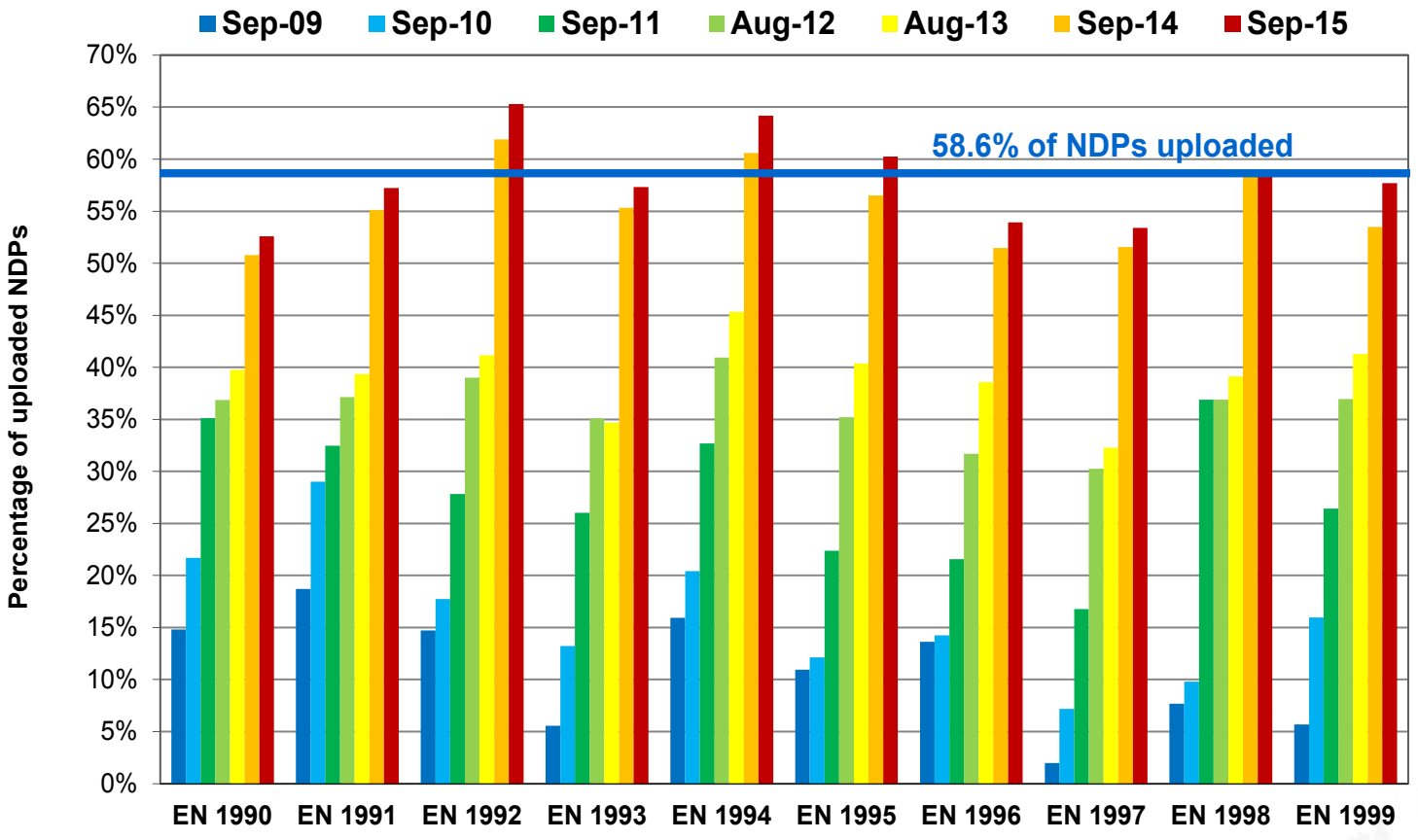
Harmonized use – NDP database

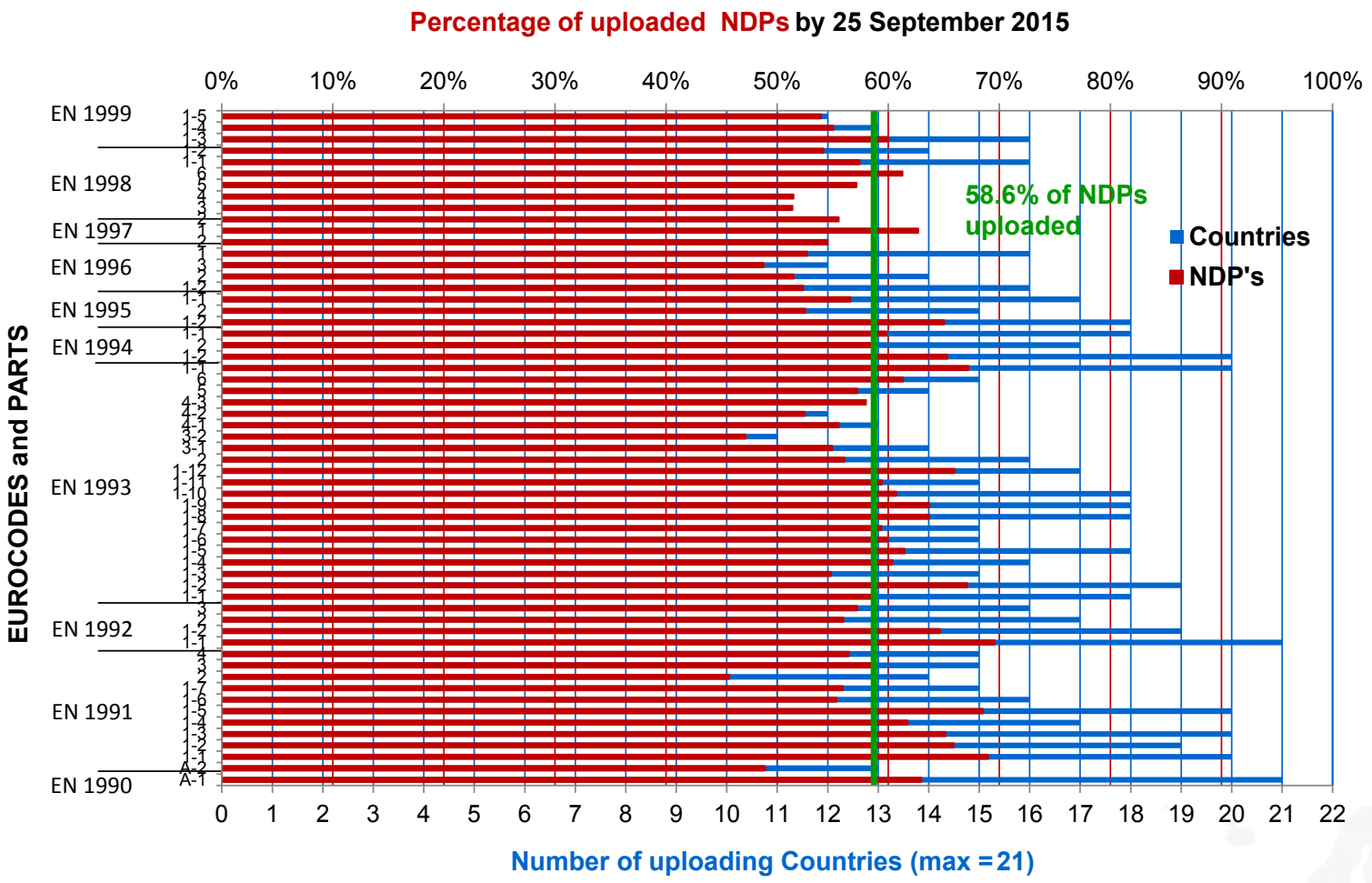
NDPs database – progress of uploading by Country
(by 25 September 2015 - % calculated on published NAs)



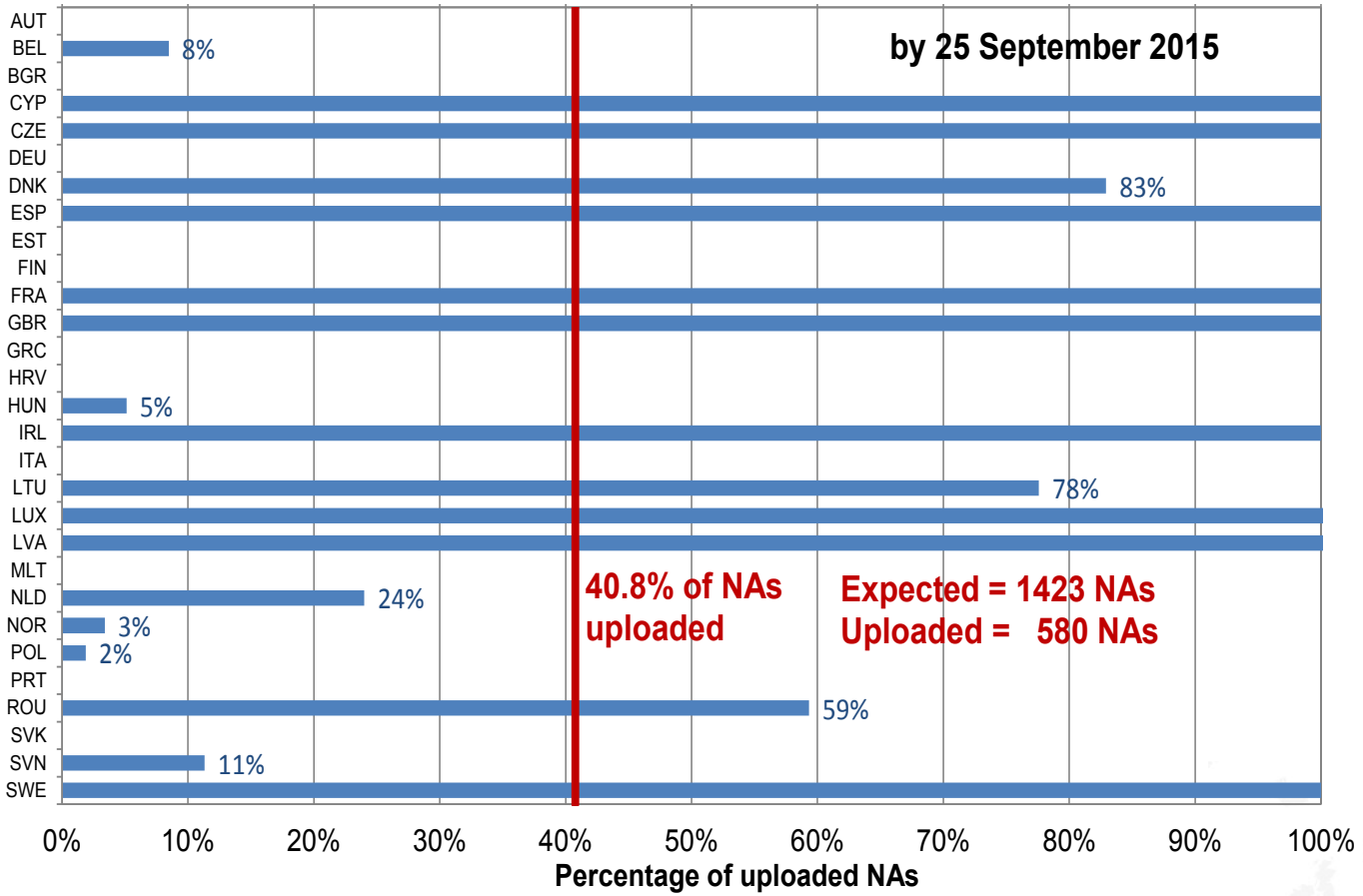
NDPs database – progress of uploading by Eurocode

by 25 September 2015



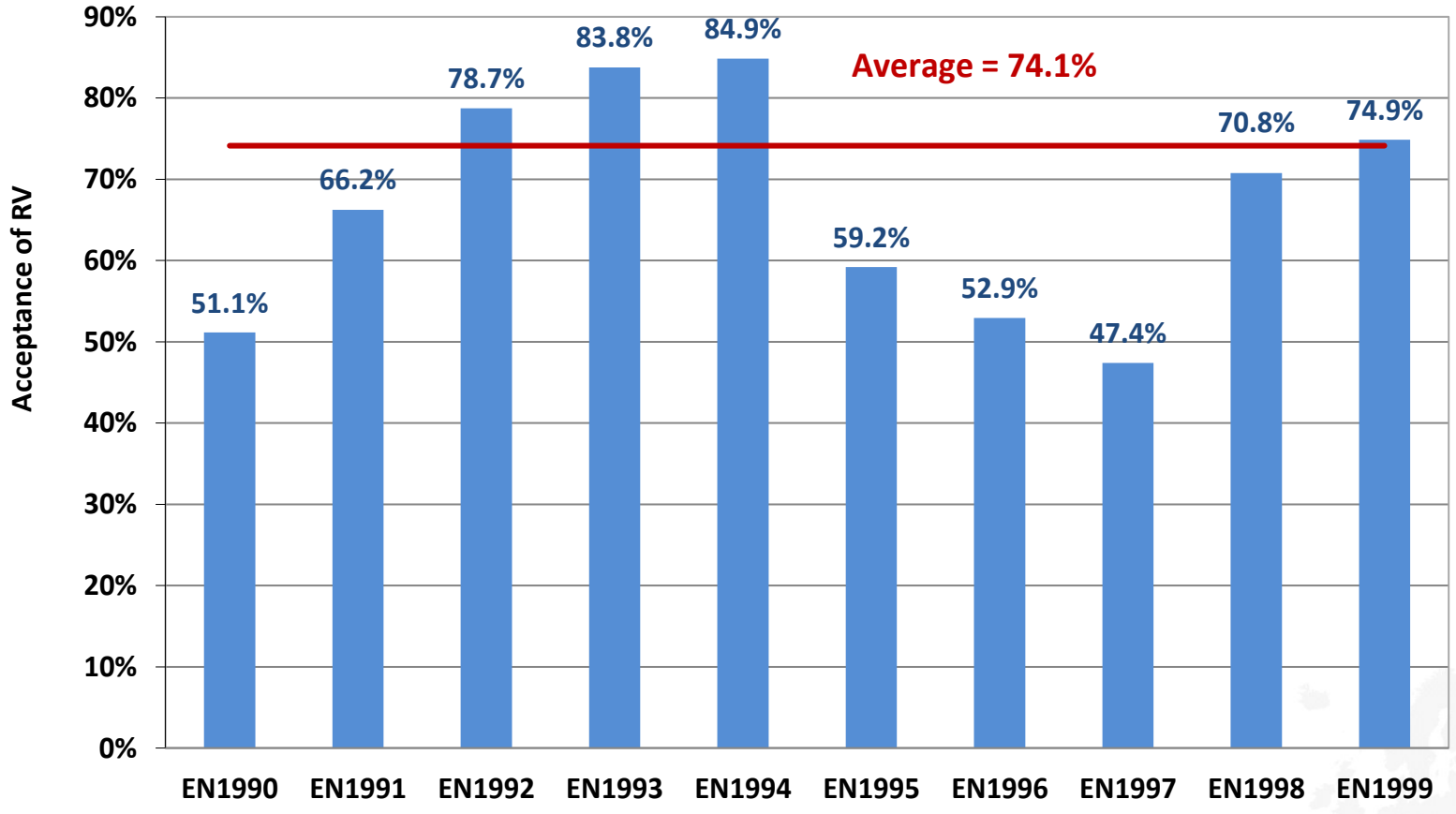

Percentage of uploaded NDPs by 25 September 2015
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
EN 1999
EN 1998
EN 1997
EN 1996
EN 1995
EN 1994
EN 1993
EN 1992
EN 1991
EN 1990
EUROCODES and PARTS
58.6% of NDPs uploaded
Countries
NDP's
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Number of uploading Countries (max =21)

National Annexes – progress of uploading by country

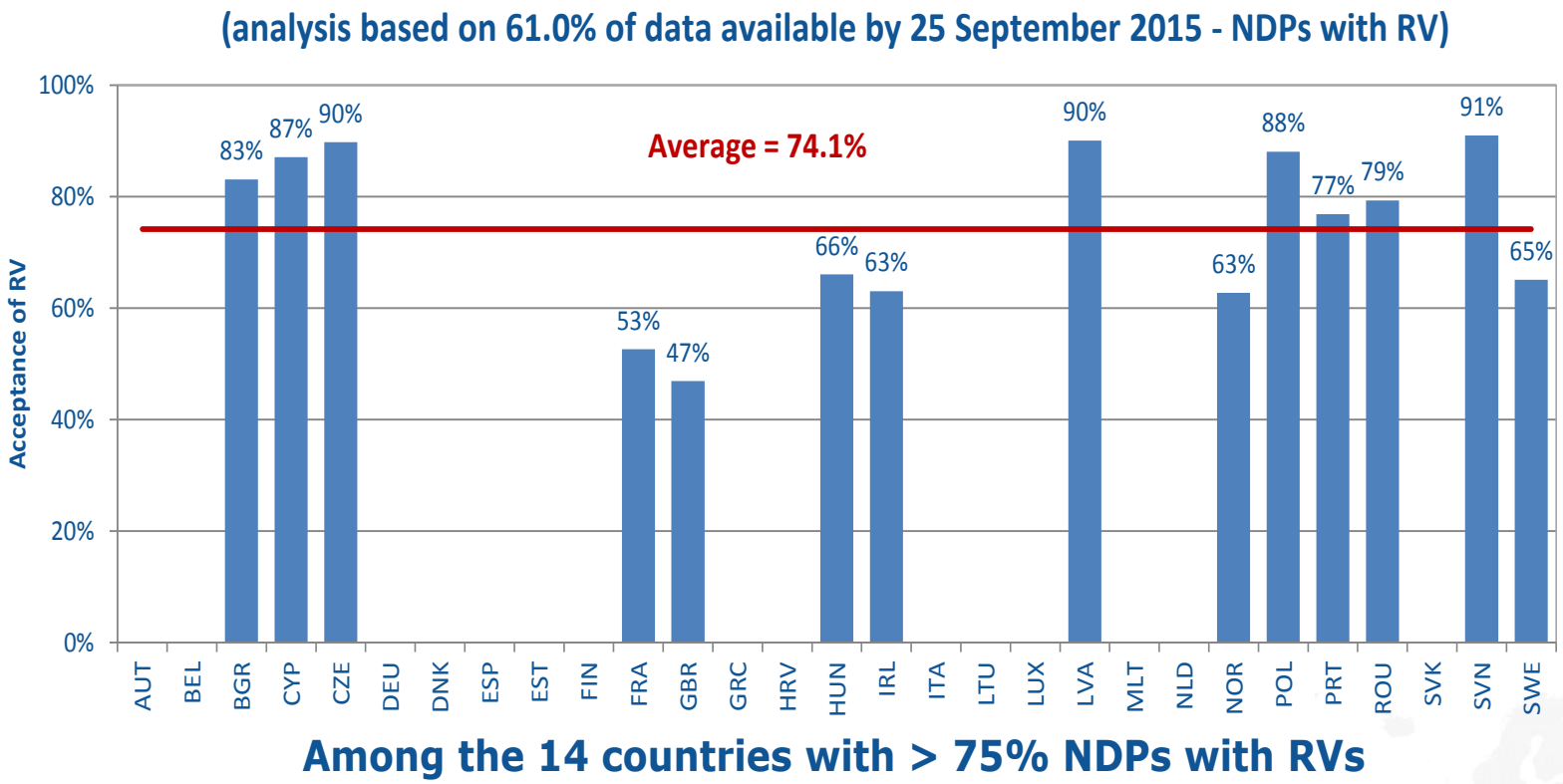


NDPs database: acceptance of recommended values (RV)

analysis based on 61% of availability of the NDPs with RV by 25 September 2015



NDPs database: acceptance of recommended values



Among the 14 countries with > 75% NDPs with RVs

NDPs database: registration and use by the Balkan countries

Report generated at: 15:58 Thu 22 October 2015

EN	Total CEN	ALB	AUT	BEL	BGR	BIH	CHE	CYP	CZE	DEU	DNK	ESP	EST	FIN	FRA	GBR	GRC	HRV	HUN	IRL	ISL	ITA	LTU	LUX	LVA	MDA	MKD	MLT	MNE	NLD	NOR	POL	PRT	ROU	SRB	SVK	SVN	SWE	TUR
Total	1476	-	76	1010	1136	-	5	1426	1476	25	831	26	207	695	1350	1317	-	-	1074	1469	-	23	793	1	1128	-	-	-	-	494	1400	751	810	1362	-	465	1310	1091	-
1990	46	(-)	(TBU)	46	(TBU)	(-)	(-)	(46)	(46)	(TBU)	(10)	(NE)	(TBU)	(46)	46	46	(TBU)	(TBU)	46	46	(-)	(2)	(8)	(1)	46	(-)	(-)	(TBU)	(-)	(10)	(11)	(6)	(46)	(4)	(-)	(26)	46	(38)	(NE)
1991	348	(-)	(11)	(114)	(245)	(-)	(1)	(332)	(348)	(TBU)	(228)	(NE)	(139)	(294)	348	345	(TBU)	(TBU)	348	(345)	(-)	(TBU)	(89)	(TBU)	(249)	(-)	(-)	(TBU)	(-)	(100)	347	(180)	(215)	(327)	(-)	(75)	(243)	(303)	(TBU)
1992	221	(-)	(TBU)	(143)	(214)	(-)	(-)	(210)	(221)	(TBU)	(165)	(26)	(33)	(208)	221	218	(TBU)	(TBU)	221	(220)	(-)	(TBU)	(144)	(TBU)	(218)	(-)	(-)	(NE)	(-)	(158)	221	(174)	(213)	(205)	(-)	(177)	(219)	(212)	(NE)
1993	431	(-)	(TBU)	(430)	(405)	(-)	(-)	(420)	(431)	(25)	(192)	(TBU)	(7)	(63)	395	(291)	(TBU)	(TBU)	(142)	(430)	(-)	(TBU)	(327)	(TBU)	(401)	(-)	(-)	(NE)	(-)	(89)	431	(256)	(78)	(427)	(-)	(91)	431	(304)	(NE)
1994	52	(-)	(TBU)	(50)	52	(-)	(-)	(49)	(52)	(TBU)	(36)	(TBU)	(22)	(50)	52	52	(TBU)	(TBU)	52	(52)	(-)	(TBU)	(29)	(TBU)	(47)	(-)	(-)	(NE)	(-)	(14)	52	(31)	(36)	(51)	(-)	(33)	52	(51)	(NE)
1995	33	(-)	(TBU)	(TBU)	33	(-)	(4)	(32)	(33)	(TBU)	(26)	(NE)	(6)	(30)	33	33	(TBU)	(TBU)	33	(32)	(-)	(21)	(11)	(TBU)	(33)	(-)	(-)	(NE)	(-)	(27)	(33)	(17)	(NE)	(29)	(-)	(11)	(33)	(32)	(NE)
1996	58	(-)	(TBU)	(TBU)	58	(-)	(-)	(55)	(58)	(TBU)	(45)	(NE)	(TBU)	(4)	58	58	(TBU)	(TBU)	58	(57)	(-)	(TBU)	(33)	(TBU)	(52)	(-)	(-)	(NE)	(-)	(41)	42	(37)	(41)	(55)	(-)	(TBU)	(NE)	(36)	(NE)
1997	55	(-)	(TBU)	(TBU)	(4)	(-)	(-)	(55)	(55)	(TBU)	51	(NE)	(TBU)	(TBU)	55	55	(TBU)	(TBU)	55	(55)	(-)	(TBU)	(TBU)	(TBU)	(47)	(-)	(-)	(NE)	(-)	(55)	55	(23)	(31)	(53)	(-)	(TBU)	55	(25)	(NE)
1998	142	(-)	(TBU)	141	(59)	(-)	(-)	(137)	(142)	(TBU)	(NE)	(NE)	(NE)	(NE)	142	(129)	(TBU)	(TBU)	(80)	142	(-)	(TBU)	(112)	(TBU)	(35)	(-)	(-)	(NE)	(-)	(NE)	(118)	(NE)	(75)	(122)	(-)	(12)	(141)	(NE)	(NE)
1999	90	(-)	(65)	(86)	(66)	(-)	(-)	(90)	(90)	(TBU)	(78)	(NE)	(TBU)	(TBU)	NE	90	(TBU)	(TBU)	(39)	(90)	(-)	(TBU)	(40)	(TBU)	(TBU)	(-)	(-)	(NE)	(-)	(TBU)	90	(27)	(75)	(89)	(-)	(40)	90	90	(NE)

Country	Users nominated/registered
Albania	Not registered
BiH	1/1
fYRoM	11/6
Kosovo	Invited to register
Moldova	Not registered
Montenegro	3/3
Serbia	Not registered
Turkey	Not registered
Croatia	3/2

Harmonized use – NDP database

NDPs related to climatic and seismic maps

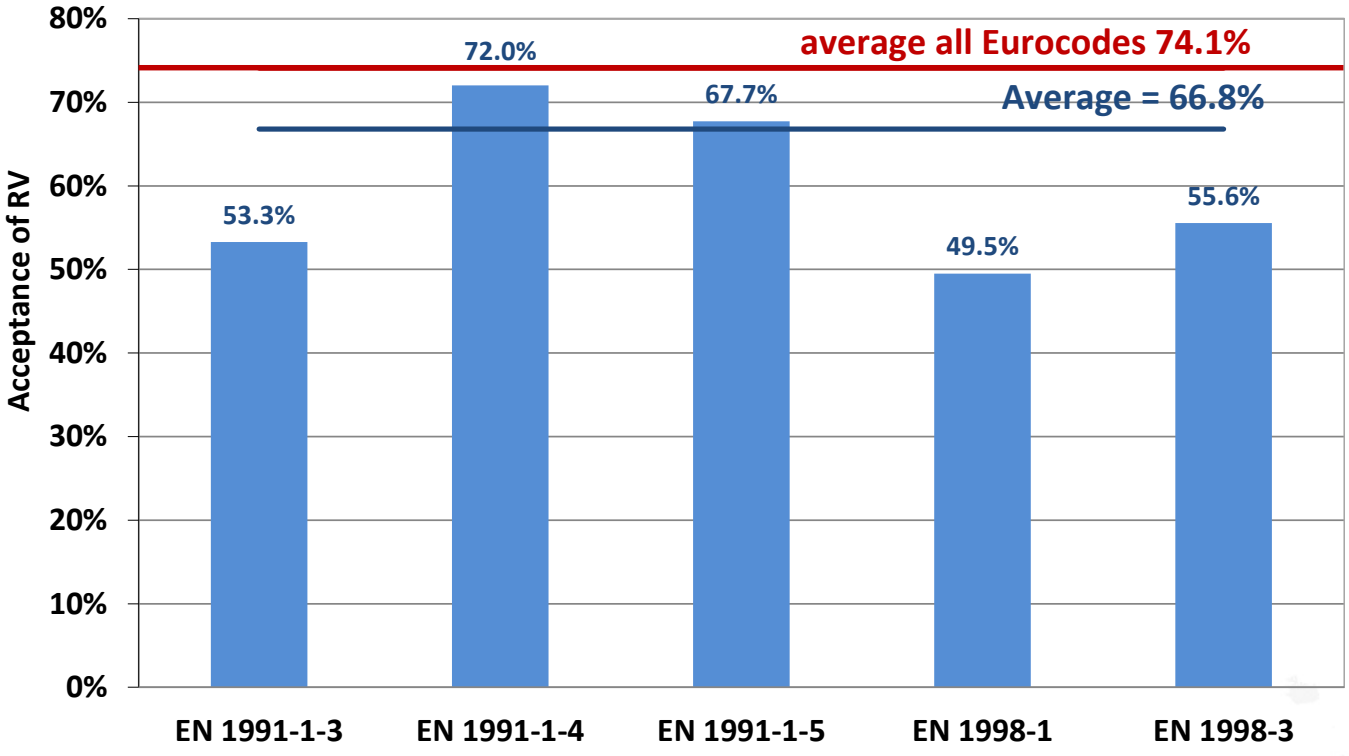
NDPs database: NDPs related to the climatic and seismic map

Eurocodes Part	Nb NDPs
EN 1991: ACTIONS ON STRUCTURES; Part 1-3: General Actions - Snow loads	33
EN 1991: ACTIONS ON STRUCTURES; Part 1-4: General Actions - Wind actions	68
EN 1991: ACTIONS ON STRUCTURES; Part 1-5: General Actions - Thermal actions	29
EN 1998: DESIGN OF STRUCTURES FOR EARTHQUAKE RESISTANCE, Part 1: General rules, seismic actions and rules for buildings	11
EN 1998: DESIGN OF STRUCTURES FOR EARTHQUAKE RESISTANCE, Part 3: Assessment and retrofitting of buildings	1
	Total = 141

NDPs database: acceptance of recommended values (RV)

Analysis based on 65.2 % of data available by October, 14th, 2015

NDPs with RV



NDPs with highest and lowest rate of acceptance

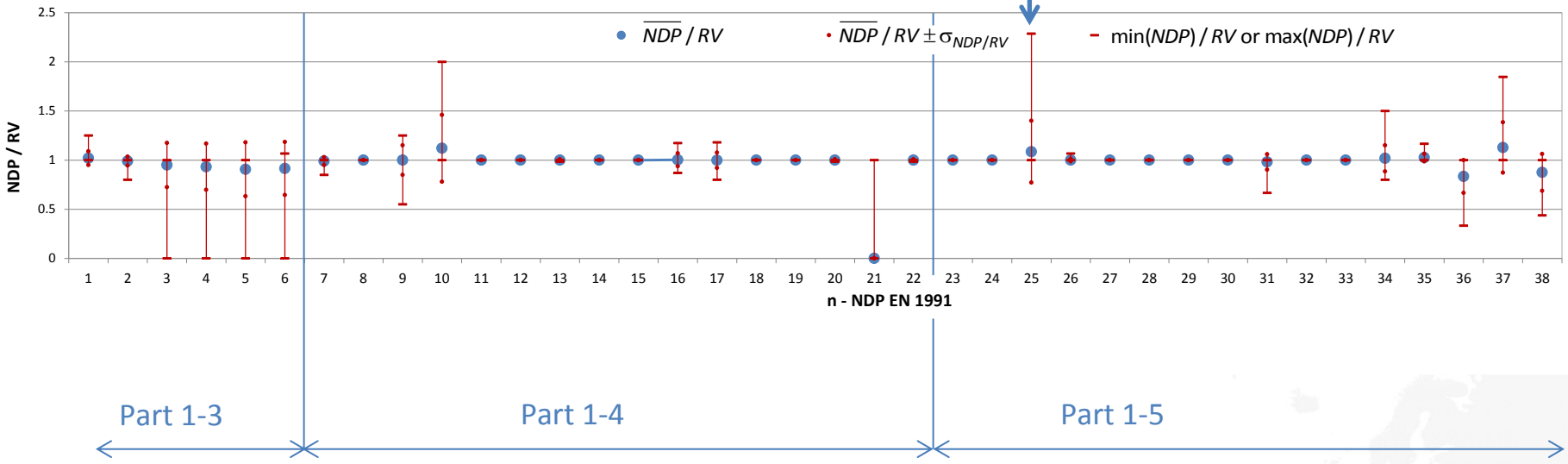
Analysis based on 65.2 % of data available by October, 14th, 2015

NDPs with RV

EN	Part	NDP	Min % acceptance	Max % acceptance
1991	1-3	4.3 (1) The coefficient for exceptional snow loads C_{esl}	27.8	
		Annex A (1 Table A.1) Definition of exceptional conditions and definition of design situations which apply for the particular local effects described in Section 6 for cases B1 and B3	27.8	
		5.2 (7) The values of the exposure coefficient C_e for different topographies		70.0
	1-4	4.3.2 (1) The procedure for determining the roughness factor, $c_r(z)$	47.1	
		7.10 (1 NOTE 1) The values of the alongwind force coefficient of spheres $c_{f,x}$		100
		7.6 (1 NOTE 1) The values of the reduction factor for square sections with rounded corners, ψ_r		100
	1-5	6.1.4.2 (1) Values of vertical temperature differences for bridge decks	47.4	
		6.1.6 (1) Values for the differences in the uniform temperature component		84.2
1998	1	3.2.1 (4) Governing parameter (identification and value) for threshold of low seismicity	16.7	
		3.2.2.5 (4) Lower bound factor β on design spectral values		92.3
	3	2.1 (3) Return period of seismic actions under which the Limit States should not be exceeded	55.6	55.6

Mean value, standard deviation, maximum and minimum value of NDP/RV; type 1.1 NDPs of EN 1991

#	Part	Section & clause	NDP Description	Parameter Description
25	1-5	6.1.5 (1)	Values of ω_N and ω_M ω_N - reduction factor of uniform temperature component for combination with temperature difference component ω_M - reduction factor of temperature difference component for combination with uniform temperature component	Values of ω_N



NDP type 1.1: Predetermined Parameters (with recommended value(s))

Numbering of the parameters of type 1.1 NDPs of EN 1991

Detailed description of the parameters can be seen in **Annex 1**

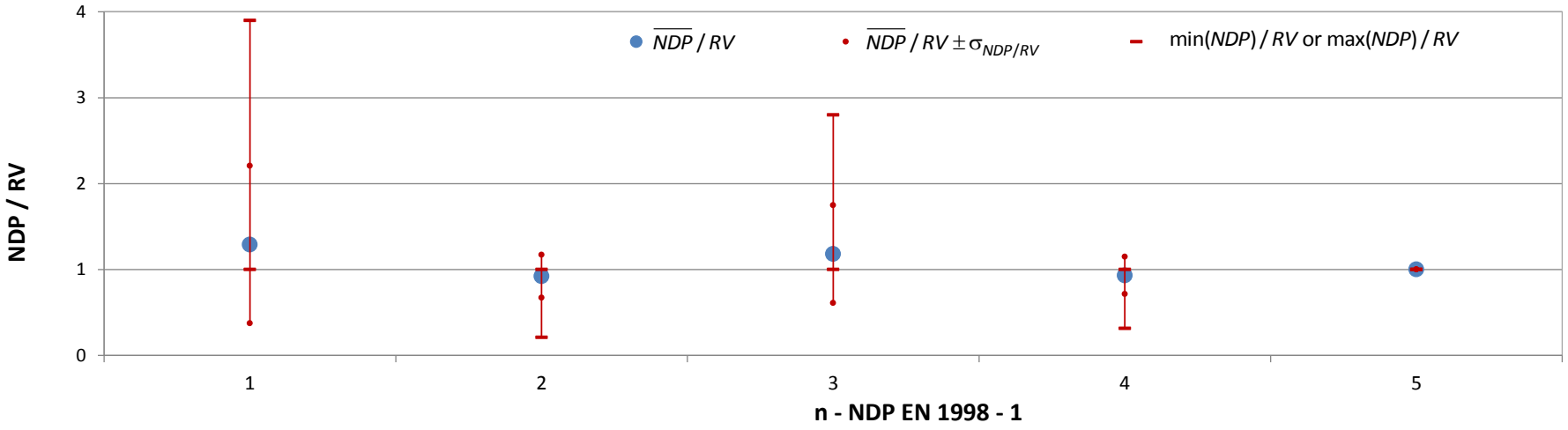
#	EN	Part	Section	Clause
1	1991	1-3	4.3	1
2	1991	1-3	5.3.5	1 NOTE 1
3	1991	1-3	5.3.6	1 NOTE 1
4	1991	1-3	5.3.6	1 NOTE 1
5	1991	1-3	5.3.6	1 NOTE 2
6	1991	1-3	5.3.6	1 NOTE 2

#	EN	Part	Section	Clause
7	1991	1-4	4.2	2 NOTE 2
8	1991	1-4	4.2	2 NOTE 3
9	1991	1-4	4.2	2 NOTE 5
10	1991	1-4	4.2	2 NOTE 5
11	1991	1-4	4.3.1	1 NOTE 1
12	1991	1-4	4.4	1 NOTE 2
13	1991	1-4	4.5	1 NOTE 2
14	1991	1-4	7.4.3	2
15	1991	1-4	7.7	1 NOTE 1
16	1991	1-4	8.1	4
17	1991	1-4	8.1	5
18	1991	1-4	8.3.4	1
19	1991	1-4	8.3.4	1
20	1991	1-4	Annex E.1.3.3	1
21	1991	1-4	E.1.5.2.6	1 NOTE 1
22	1991	1-4	Annex E.1.5.3	2 NOTE 1

#	EN	Part	Section	Clause
23	1991	1-5	6.1.4.3	1
24	1991	1-5	6.1.4.4	1
25	1991	1-5	6.1.5	1
26	1991	1-5	6.1.5	1
27	1991	1-5	6.1.6	1
28	1991	1-5	6.1.6	1
29	1991	1-5	6.1.6	1
30	1991	1-5	6.2.2	1
31	1991	1-5	6.2.2	2
32	1991	1-5	7.5	3
33	1991	1-5	7.5	4
34	1991	1-5	Annex A.1	3
35	1991	1-5	Annex A.2	2
36	1991	1-5	Annex A.2	2
37	1991	1-5	Annex A.2	2
38	1991	1-5	Annex A.2	2

NDPs with more than 1 parameter are shown in common boxes

Mean value, standard deviation, maximum and minimum value of NDP/RV; type 1.1 NDPs of EN 1998



#	Section	Clause	NDP Description	NDP Parameter
1	2.1	1 NOTE 1	Reference return period T_{NCR} of seismic action for no-collapse requirement (or, equivalently, reference probability of exceedance in 50 years, P_{NCR}	The value of P_{NCR} (%)
2	2.1	1 NOTE 1	Reference return period T_{NCR} of seismic action for no-collapse requirement (or, equivalently, reference probability of exceedance in 50 years, P_{NCR}	The value of T_{NCR} (years)
3	2.1	1 NOTE 3	Reference return period T_{DLR} of seismic action for the damage limitation requirement. (or, equivalently, reference probability of exceedance in 10 years, P_{DLR}	The value of P_{DLR} (%)
4	2.1	1 NOTE 3	Reference return period T_{DLR} of seismic action for the damage limitation requirement. (or, equivalently, reference probability of exceedance in 10 years, P_{DLR}	The value of T_{DLR} (years)
5	3.2.2.5	4	Lower bound factor, β on design spectral values	The value of lower bound factor, β

Further Development of the Eurocodes

Standardisation works for 2G

2015 Start of the Standardization Works of CEN/TC250 (end of the year)

2020 - Publication of the 2G

2nd .... document on the 2G of the Eurocodes

Download from:
http://eurocodes.jrc.ec.europa.eu/showpublication.php?id=535 ....

European Commission

New fields of design

Adaptation to Climate Change

Flash floods on 1 February 2015
Collapse of bridge in Arta, Greece

Design now

Design codes **use past climatic load data to forecast** future loads on buildings. The possible **existence of long term trends** is not considered.

In the future …….

The alteration of climatic loads under climate change shall be included.

? will the probability of the "extreme events" (as for now) remain low enough to treat them as **accidental actions**,

? OR to consider in the **design actions**:

- **Flash floods**: implications on design of bridges, foundations, retaining walls, ponding of flat roofs;
- **Thunderstorms**: implications on wind loading;
- **Snow storms**: implications on snow and wind loading;
- **New (different) combination factors of climatic actions** in a design situation (ψ factors).

M515 EN / 12th December 2012 to CEN for 2G Eurocodes

Commission request:

- .....
- a technical report on **how to adapt** the existing **Eurocodes** and the new Eurocode for structural glass to take into account the relevant impacts of future **climate change.**

EU Strategy on adaptation to climate change COM(2013) 216

Building on the recent mandate **to assess** the climate change **implications for Eurocodes**, it should be analysed to what extent standards, technical specifications, codes and safety provisions for physical infrastructure should be strengthened to cope with extreme events and other climate impacts.

Pilot Study on Snow Loading

Estimation of trends in snow loading :

- Pisa University/CEN/TC250 (Pisa University was leading the European snow load research project 1996-1999)
- JRC ELSA and Climate Risk Management Units

Synergy with INTACT FP7 project (prevention of major disasters and/or cascading effects on critical infrastructure) and RAIN FP7 project (Risk analysis of infrastructure networks in response to extreme weather)

- Start collaboration on handling of meteorological and climate change projections data, exchange of information on extreme events.

European Commission

International Promotion and Training

International Promotion and Training on the Eurocodes

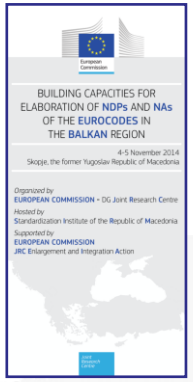
2005 – Start of the JRC – Eurocodes promotion with pilot events

2009 –2011
'BSI project'
Promotion in 3rd countries

2014
Coordinated promotion of European standards and policies

2008 - Strategy for Promotion (JRC Report)

2012 -2014 Eurocodes Promotion on the Basis of Political Drivers (e.g. EU-Russia dialogues, and E&I - Balkan Region)



ELABORATION OF MAPS FOR CLIMATIC AND SEISMIC ACTIONS FOR STRUCTURAL DESIGN IN THE BALKAN REGION

27-28 October 2015, Zagreb

Workshop on elaboration of maps for climatic and seismic actions for structural design in the Balkan Region

(JRC Integration and Enlargement Action)

What does the world say about the Eurocodes

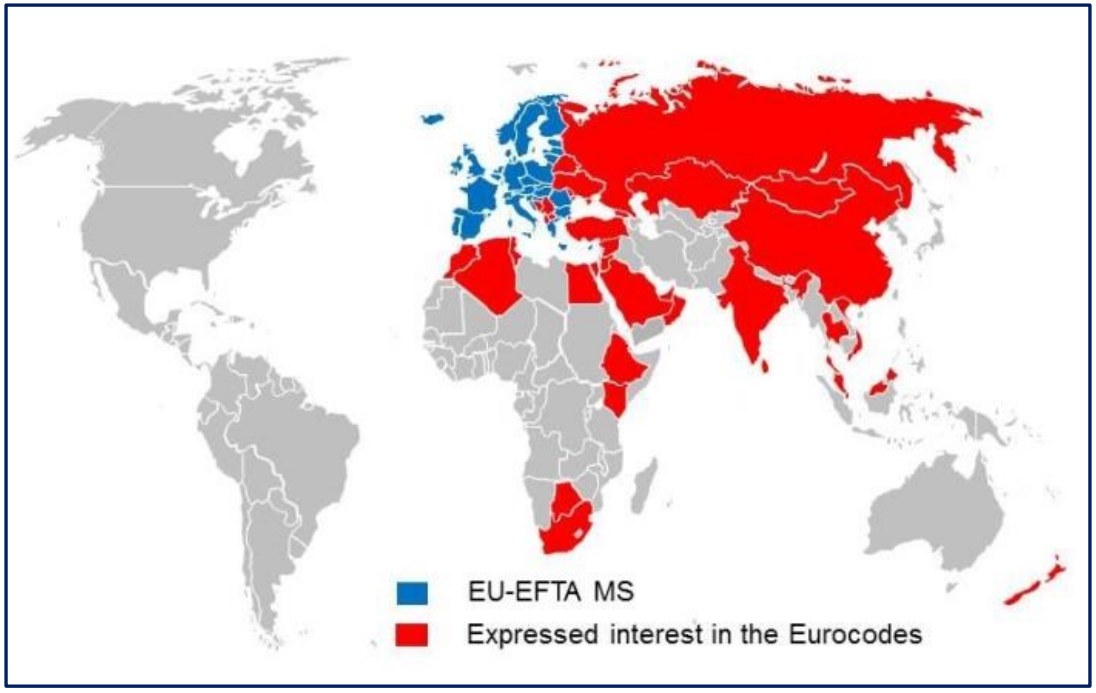
The JRC European Media Monitor

What does the world say about the Eurocodes

The JRC European Media Monitor

14 October 2015, On-line Media Press, Serbia: a steel railway bridge over the river Tamis, with a length of 242 meters was completed in mid-September. The bridge was designed according to current European design standards (EUROCODES).

Eurocodes all-over the world



Ukraine: Eurocodes implemented since 1.07.2014 in coexistence with the old Norms.

Belarus: Eurocodes obligatory for RC structures since 1.01.2015, for steel and aluminium - since 1.07.2015.

Kazakhstan: Eurocodes implemented since 1.07.2015, coexistence with the old Norms until 2020.

Algeria: The National Highways Agency awarded EUR 11 million contract to the Spanish Technology Group INDRA to modernise the motorway tunnel of Bouira, including adaptation to the requirements of the Eurocodes.

Malaysia: Interest to the Eurocodes after the 5 of June 2015 Sabah earthquake.

European Commission

Thank you for your attention

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

Annex 1 - Description of the parameters of type 1.1 NDPs
EN 1991-3

#	Section	Clause	NDP Description	NDP Parameter
1	4.3	1	The coefficient for exceptional snow loads C_{esl}	The coefficient for exceptional snow loads C_{esl}
2	5.3.5	1 NOTE 1	The upper value of μ_3	The upper value for μ_3
3 4	5.3.6	1 NOTE 1	The range for the snow load shape coefficient due to wind, μ_w	The snow load shape coefficient due to wind, $\mu_w \leq$:
5 6	5.3.6	1 NOTE 2	A restriction for the drift length, l_s	A restriction for the drift length, $l_s \leq$ (m)

Annex 1 - Description of the parameters of type 1.1 NDPs
EN 1991-4

#	Section	Clause	NDP Description	NDP Parameter
7	4.2	2 NOTE 2	The value of the directional factor, c_{dir}, for various wind directions	The value of the directional factor, c_{dir}, for various wind directions
8	4.2	2 NOTE 3	The value of the season factor, c_{season}	The value of the season factor, c_{season}
9 10	4.2	2 NOTE 5	The values for the shape parameter depending on the coefficient of variation of the extreme-value distribution, K and the exponent, n	The value for the shape parameter depending on the coefficient of variation of the extreme-value distribution, K The value for the exponent, n
11	4.3.1	1 NOTE 1	The orography factor, c_0	The value of the orography factor, c_0
12	4.4	1 NOTE 2	The value of the turbulence factor, k_I	The value of the turbulence factor, k_I
13	4.5	1 NOTE 2	The values for the air density, ρ	The value for the air density, ρ
14	7.4.3	2	The value of the horizontal eccentricity, e	The value of the horizontal eccentricity, e = ± .... b
15	7.7	1 NOTE 1	The value for $c_{f,0}$ for the structural elements with sharp edged section	The value for $c_{f,0}$
16	8.1	4	A value for $V^{*}_{b,0}$	The value for $V^{*}_{b,0}$ (m/s)
17	8.1	5	A value for $V^{**}_{b,0}$	The value of $V^{**}_{b,0}$ (m/s)
18 19	8.3.4	1	The longitudinal wind forces in y-direction	The longitudinal wind forces in y-direction in percentage of the wind forces in x-direction for plated bridges (%) The longitudinal wind forces in y-direction in percentage of the wind forces in x-direction for truss bridges (%)
20	Annex E.1.3.3	1	The value of the air density ρ; under vortex shedding conditions	The value of the air density ρ under vortex shedding conditions (kg/m^3)
21	Annex E.1.5.2.6	1 NOTE 1	The minimum value for the number of load cycles N caused by vortex excited oscillation	The minimum value of the number of load cycles N caused by vortex excited oscillation ≥
22	Annex E.1.5.3	2 NOTE 1	The value of the air density ρ under vortex shedding conditions	The value of the air density ρ under vortex shedding conditions (kg/m^3)

Annex 1 - Description of the parameters of type 1.1 NDPs
EN 1991-5

#	Section	Clause	NDP Description	NDP Parameter
23	6.1.4.3	1	Numerical values for the temperature difference	Linear temperature difference between the outer edges of the bridge independent of the width of the bridge (^{0}C)
24	6.1.4.4	1	Temperature difference components within walls of concrete box girders	Value for a linear temperature difference (^{0}C)
25	6.1.5	1	Numerical values of ω_N and ω_M	Numerical values of ω_N
26				Numerical values of ω_M
27	6.1.6	1	Values for the differences in the uniform temperature component	Values for the differences in the uniform temperature between main structural elements (e.g. tie and arch) (^{0}C)
28				Values for the differences in the uniform temperature for light colour respectively between suspension/stay cables and deck (or tower) (^{0}C)
29				Values for the differences in the uniform temperature for dark colour respectively between suspension/stay cables and deck (or tower) (^{0}C)
30	6.2.2	1	For concrete piers (hollow or solid), the linear temperature differences between opposite outer faces	For concrete piers (hollow or solid), the linear temperature differences between opposite outer faces (^{0}C)
31	6.2.2	2	For walls, the linear temperature differences between the inner and outer faces	For walls, the linear temperature differences between the inner and outer faces (in ^{0}C)
32	7.5	3	For concrete pipelines, the linear temperature difference component between the inner and outer faces of the wall	For concrete pipelines, the linear temperature difference component between the inner and outer faces of the wall (in ^{0}C)
33	7.5	4	The value of the difference of temperature	The value of the difference of temperature (^{0}C)
34	Annex A.1	3	Value of the initial temperature, T_0	Value of the initial temperature, T_0
35	Annex A.2	2	The values of the coefficients k_1, k_2, k_3 and k_4 based on the values of parameters u and c	The values of the coefficients k_1
36				The values of the coefficients k_2
37				The values of the coefficients k_3
38				The values of the coefficients k_4