

Siltakonsulttipäivät

2. sukupolven eurokoodit

Janne Isohaka

29.5.2024

Julkinen



Väylävirasto
Trafikledsverket



Esityksen sisältö

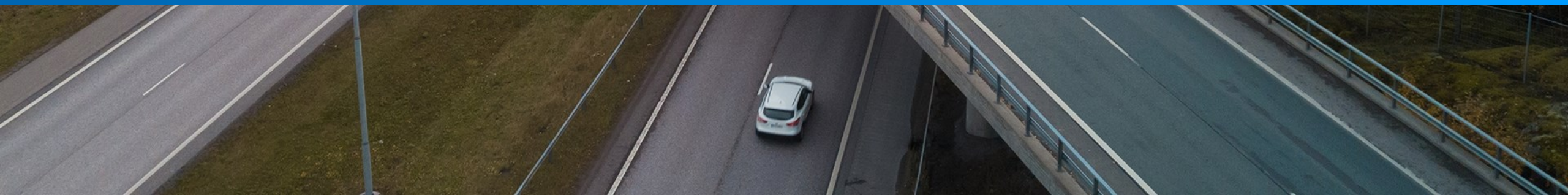
- Yleiskatsaus
- Aikataulu
- Tiedossa olevia muutoksia
- Käyttöönotto

- Betonieurokoodiin tulevia muutoksia (Anssi Laaksonen)
- Eurokoodien laatimisen ja kansallisen käyttöönoton erityispiirteet (Heikki Lilja)





Yleiskatsaus



Historiakatsaus

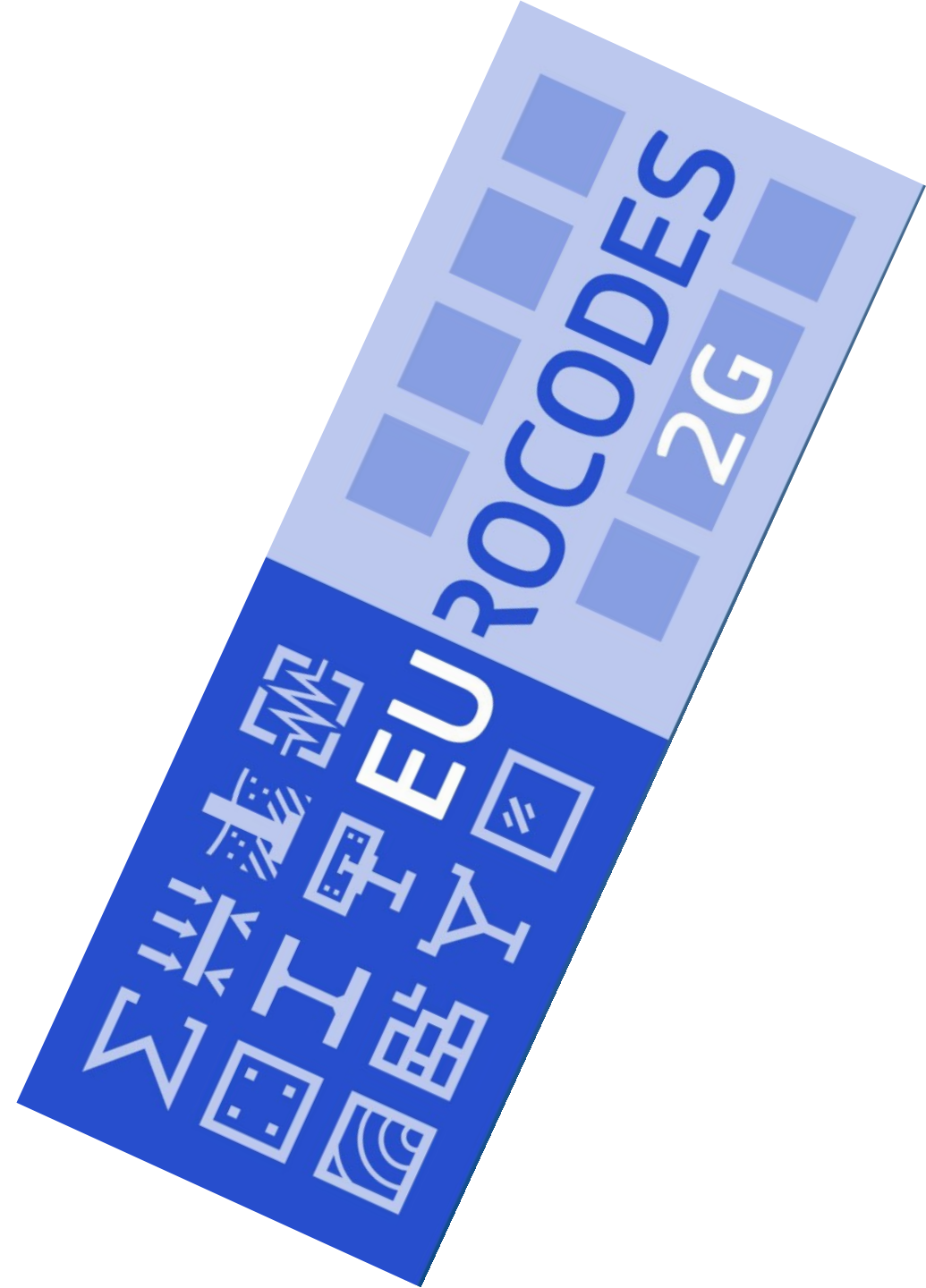
- 1975: EU:n komission päätös toimenpideohjelmasta poistaa kaupan teknisiä esteitä ja yhdenmukaistaa teknisiä määräyksiä
- 1984: 1. sukupolven suunnitteluohjeet julkaistaan
 - Alkuun vaihtoehtoisia kansallisille ohjeille ja myöhemmin korvaavia
- 1989: Organisoituvastuun siirto komissiolta CENille
- 1992-1998: Esistandardien (ENV) julkaisu, 62 kpl
 - YM julkaisi isolle osalle kansalliset soveltamisasiakirjat
 - Silloilla ei kansallisia soveltamisasiakirjoja
- 1998: Esistandardien (ENV) muutos varsinaisiksi standardeiksi alkaa
- 2002-2007: Varsinaisten standardien (EN) julkaisu, 58 kpl

Historiakatsaus jatkuu

- 2007: YM julkaisi ensimmäiset kansalliset liitteet
- 2008-2009: YM julkaisi loput kansalliset liitteet
- 2010: LVM julkaisi sillansuunnittelua koskevat kansalliset liitteet
- 30.4.2010: Siirtymäaika päättyi. Eurokoodit käytössä ja kansalliset standardit kumottuna
- 2010: 2. sukupolven Eurokoodien esivalmistelu aloitetaan
- 2015: 2. sukupolven Eurokoodien varsinainen laadinta aloitetaan

Miksi 2. sukupolvi?

- Rakennusala kehittyi
 - Uusin tutkimustieto mitoitusmenettelyjen taustalla
 - Rakenteen elinkaaren huomiointi (ympäristövaikutukset jne.)
- Ease-of-use
 - Helppokäyttöisyyden parantaminen
- Harmonisointi
 - Kansallisten valintojen vähentäminen
- Uudet standardit/tekniset ohjeet
 - Lasirakenteet
 - *Kuitupolymeerirakenteet (FPC)*
 - *Kalvorakenteet*



Standardien muutokset eriteltyinä 1/3:

1st gen Tarkenne	Eurokoodi	Eurokoodi	2nd gen Tarkenne
	EN1990	EN1990	
Eurocode - Basis of structural design	EN 1990:2002	EN1990-1	Eurocode - Basis of structural and geotechnical design - Part 1: New structures
		EN1990-2	Eurocode - Basis of structural and geotechnical design - Part 2: Assessment of existing structures
	EN1991	EN1991	
Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings	EN 1991-1-1:2002	EN 1991-1-1	Eurocode 1 – Actions on structures -Part 1-1 : General actions – Densities of materials, self-weight of construction works and imposed loads on buildings
Eurocode 1: Actions on structures - Part 1-2: General actions - Actions on structures exposed to fire	EN 1991-1-2:2002	EN 1991-1-2	Eurocode 1 - Actions on structures –Part 1-2: General actions – Actions on structures exposed to fire
Eurocode 1: Actions on structures - Part 1-3: General actions - Snow loads	EN 1991-1-3:2003	EN 1991-1-3	Eurocode 1 - Actions on structures –Part 1-3: General actions – Snow loads
Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions	EN 1991-1-4:2005	EN 1991-1-4	Eurocode 1 - Actions on structures –Part 1-4: General actions – Wind actions
Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions	EN 1991-1-5:2003	EN 1991-1-5	Eurocode 1 - Actions on structures –Part 1-5: General actions – Thermal actions
Eurocode 1: Actions on structures - Part 1-6: General actions - Actions during execution	EN 1991-1-6:2005	EN 1991-1-6	Eurocode 1: Actions on structures - Part 1-6: General actions - Actions during execution
Eurocode 1: Actions on structures - Part 1-7: General actions - Accidental actions	EN 1991-1-7:2006	EN 1991-1-7	Eurocode 1: Actions on structures - Part 1-7: General actions - Accidental actions
		EN 1991-1-8	Eurocode 1 - Actions on structures –Part 1-8: General actions - Actions from waves and currents on coastal structures
		EN 1991-1-9	Eurocode 1 - Actions on structures –Part 1-9: General actions - Atmospherer icing
Eurocode 1: Actions on structures - Part 2: Traffic loads on bridges	EN 1991-2:2003	EN 1991-2	Eurocode 1 - Actions on structures – Part 2 Traffic loads on bridges and other civil engineering works
Eurocode 1: Actions on structures - Part 3: Actions induced by cranes and machinery	EN 1991-3:2006	EN 1991-3	Eurocode 1: Actions on structures - Part 3: Actions induced by cranes and machinery
Eurocode 1: Actions on structures - Part 4: Silos and tanks	EN 1991-4: 2006	EN 1991-4	Eurocode 1 - Actions on structures – Part 4: Silos and tanks
	EN1992	EN1992	
Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings	EN 1992-1-1:2004	EN1992-1-1	Eurocode 2: General rules, rules for buildings, bridges and civil engineering structures
Eurocode 2: Design of concrete structures - Part 1-2: General rules - Structural fire design	EN 1992-1-2:2004	EN1992-1-2	Eurocode 2: General – Structural fire design
Eurocode 2: Design of concrete structures - Part 2: Concrete bridges - Design and detailing rules	EN 1992-2:2005		
Eurocode 2: Design of concrete structures - Part 3: Liquid retaining and containment structures	EN 1992-3:2006		
Eurocode 2: Design of concrete structures - Part 4: Design of fastenings for use in concrete	EN 1992-4:2018	EN 1992-4	Eurocode 2: Design of fastening for use in concrete

Standardien muutokset eriteltyinä 2/3:

1st gen Tarkenne	Eurokoodi EN1993	Eurokoodi EN1993	2nd gen Tarkenne
Eurocode 3: Design of steel structures - Part 1-1: General rules and rules for buildings	EN 1993-1-1:2005	EN 1993-1-1	Eurocode 3 — Design of steel structures — Part 1-1: General rules and rules for buildings
Eurocode 3: Design of steel structures - Part 1-2: General rules - Structural fire design	EN 1993-1-2:2005	EN 1993-1-2	Eurocode 3: Design of steel structures - Part 1-2: General rules - Structural fire design
Eurocode 3: Design of steel structures - Part 1-3: General rules - Supplementary rules for cold-formed members and sheeting	EN 1993-1-3:2006	EN 1993-1-3	Eurocode 3: Design of steel structures - Part 1-3: General rules - Supplementary rules for cold-formed members and sheeting
Eurocode 3: Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels	EN 1993-1-4:2006	EN 1993-1-4	Eurocode 3: Design of steel structures - Part 1-4: General rules - Stainless steels
Eurocode 3: Design of steel structures - Part 1-5: General rules - Plated structural elements	EN 1993-1-5:2006	EN 1993-1-5	Eurocode 3: Design of steel structures - Part 1-5: General rules - Plated structural elements
Eurocode 3: Design of steel structures - Part 1-6: Strength and stability of shell structures	EN 1993-1-6:2007	EN 1993-1-6	Eurocode 3: Design of steel structures - Part 1-6: Strength and stability of shell structures
Eurocode 3: Design of steel structures - Part 1-7: Strength and stability of planar plated structures subject to out of plane loading	EN 1993-1-7:2007	EN 1993-1-7	Eurocode 3: Design of steel structures - Part 1-7: Plate assemblies with elements under transverse loads
Eurocode 3: Design of steel structures - Part 1-8: Design of joints	EN 1993-1-8:2005	EN 1993-1-8	Eurocode 3: Design of steel structures - Part 1-8: Design of joints
Eurocode 3: Design of steel structures - Part 1-9: Fatigue	EN 1993-1-9:2005	EN 1993-1-9	Eurocode 3: Design of steel structures - Part 1-9: Fatigue
Eurocode 3: Design of steel structures - Part 1-10: Material toughness and through-thickness properties	EN 1993-1-10:2005	EN 1993-1-10	Eurocode 3: Design of steel structures - Part 1-10: Material toughness and through-thickness properties
Eurocode 3: Design of steel structures - Part 1-11: Design of structures with tension components	EN 1993-1-11:2006	EN 1993-1-11	Eurocode 3: Design of steel structures - Part 1-11: Design of structures with tension components
Eurocode 3: Design of steel structures - Part 1-12: General - High strength steels	EN 1993-1-12:2007	EN 1993-1-12	Eurocode 3: Design of steel structures - Part 1-12: Additional rules for steel grades up to S960
		EN 1993-1-13	Eurocode 3: Design of steel structures - Part 1-13: Steel beams with large web openings
		EN 1993-1-14	Eurocode 3: Design of steel structures - Part 1-14: Design assisted by finite element analysis
Eurocode 3: Design of steel structures - Part 2: Steel bridges	EN 1993-2:2006	EN 1993-2	Eurocode 3: Design of steel structures - Part 2: Steel bridges
Eurocode 3: Design of steel structures - Part 3-1: Towers, masts and chimneys – Towers and masts	EN 1993-3-1:2006	EN 1993-3	Eurocode 3: Design of steel structures - Part 3: Towers, masts and chimneys
Eurocode 3: Design of steel structures - Part 3-2: Towers, masts and chimneys – Chimneys	EN 1993-3-2:2006		
Eurocode 3: Design of steel structures - Part 4-1: Silos	EN 1993-4-1:2007	EN 1993-4-1	Eurocode 3: Design of steel structures - Part 4-1: Silos
Eurocode 3: Design of steel structures - Part 4-2: Tanks	EN 1993-4-2:2007	EN 1993-4-2	Eurocode 3: Design of steel structures - Part 4-2: Tanks
Eurocode 3: Design of steel structures - Part 4-3: Pipelines	EN 1993-4-3:2007		
Eurocode 3: Design of steel structures - Part 5: Piling	EN 1993-5:2007	EN 1993-5	Eurocode 3: Design of steel structures - Part 5: Piling
Eurocode 3: Design of steel structures - Part 6: Crane supporting structures	EN 1993-6:2007	EN 1993-6	Eurocode 3: Design of steel structures - Part 6: Crane supporting structures
		EN 1993-7	Eurocode 3 - Design of steel structures – Part 7: Sandwich Panels
	EN1994	EN1994	
Eurocode 4: Design of composite steel and concrete structures – Part 1-1: General rules and rules for buildings	EN 1994-1-1:2004	EN 1994-1-1	Eurocode 4: Design of composite steel and concrete structures – Part 1-1: General rules and rules for buildings
Eurocode 4: Design of composite steel and concrete structures – Part 1-2: General rules - Structural fire design	EN 1994-1-2:2005	EN 1994-1-2	Eurocode 4: Design of composite steel and concrete structures – Part 1-2: General rules - Structural fire design
Eurocode 4: Design of composite steel and concrete structures – Part 2: General rules and rules for bridges	EN 1994-2:2005	EN 1994-2	Eurocode 4: Design of composite steel and concrete structures – Part 2: General rules and rules for bridges

Standardien muutokset eriteltyinä 3/3:

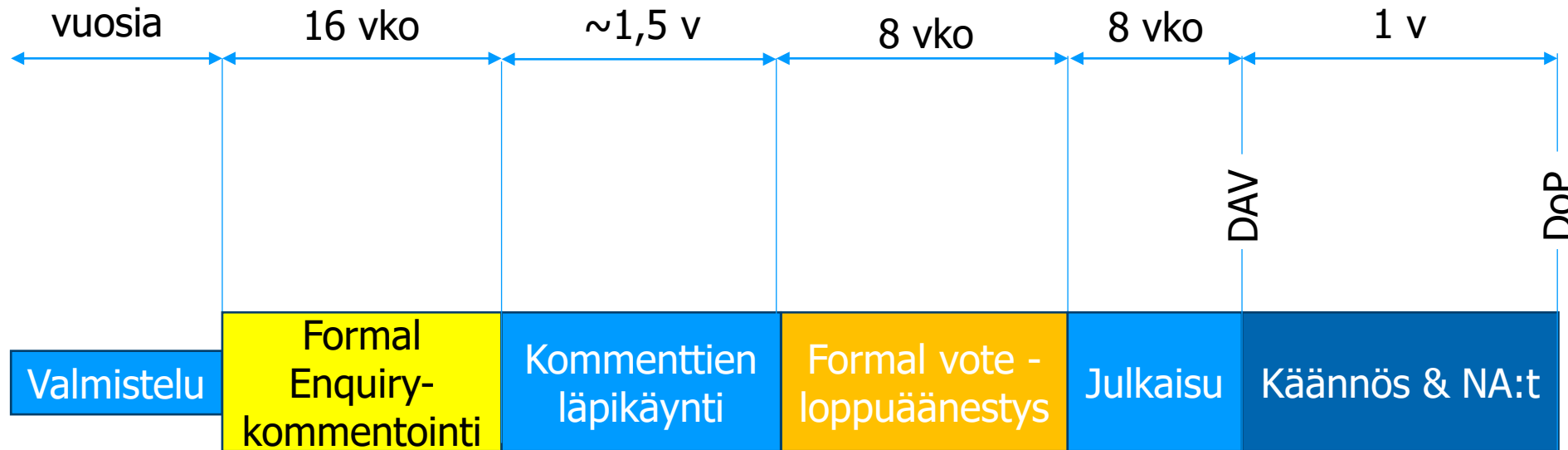
1st gen Tarkenne	Eurokoodi	Eurokoodi	2nd gen Tarkenne
	EN1995	EN1995	
Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings	EN 1995-1-1:2004	EN 1995-1-1	Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings
Eurocode 5: Design of timber structures - Part 1-2: General - Structural fire design	EN 1995-1-2:2004	EN 1995-1-2	Eurocode 5: Design of timber structures - Part 1-2: General - Structural fire design
Eurocode 5: Design of timber structures - Part 2: Bridges	EN 1995-2:2004	EN 1995-2	Eurocode 5: Design of timber structures - Part 2: Bridges
	EN1996	EN1996	
Eurocode 6: Design of masonry structures - Part 1-1: General rules for reinforced and unreinforced masonry structures	EN 1996-1-1:2005	EN 1996-1-1	Eurocode 6: Design of masonry structures - Part 1-1: General rules for reinforced and unreinforced masonry structures
Eurocode 6: Design of masonry structures - Part 1-2: General rules - Structural fire design	EN 1996-1-2:2005	EN 1996-1-2	Eurocode 6: Design of masonry structures - Part 1-2: General rules - Structural fire design
Eurocode 6: Design of masonry structures - Part 2: Design considerations, selection of materials and execution of masonry	EN 1996-2:2006	EN 1996-2	Eurocode 6: Design of masonry structures - Part 2: Design considerations, selection of materials and execution of masonry
Eurocode 6: Design of masonry structures - Part 3: Simplified calculation methods for unreinforced masonry structures	EN 1996-3:2006	EN 1996-3	Eurocode 6: Design of masonry structures - Part 3: Simplified calculation methods for unreinforced masonry structures
	EN1997	EN1997	
Eurocode 7: Geotechnical design - Part 1: General rules	EN 1997-1:2004	EN 1997-1	Eurocode 7: Geotechnical design - Part 1: General rules
Eurocode 7: Geotechnical design - Part 2: Ground investigation and testing	EN 1997-2:2007	EN 1997-2	Eurocode 7: Geotechnical design - Part 2: Ground properties
		EN 1997-3	Eurocode 7: Geotechnical design - Part 3: Geotechnical structures
	EN1998	EN1998	
Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings	EN 1998-1:2004	EN 1998-1-1	Eurocode 8: Design of structures for earthquake resistance – Part 1-1: General rules and seismic action
		EN 1998-1-2	Eurocode 8: Design of structures for earthquake resistance – Part 1-2: Rules for new buildings
Eurocode 8: Design of structures for earthquake resistance – Part 2: Bridges	EN 1998-2:2005	EN 1998-2	Eurocode 8: Design of structures for earthquake resistance – Part 2: Bridges
Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings	EN 1998-3:2005	EN 1998-3	Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings and bridges
Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines	EN 1998-4:2006	EN 1998-4	Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks, pipelines, towers, masts and chimneys
Eurocode 8: Design of structures for earthquake resistance – Part 5: Foundations, retaining structures and geotechnical aspects	EN 1998-5:2004	EN 1998-5	Eurocode 8: Design of structures for earthquake resistance – Part 5: Geotechnical aspects, Foundations, Retaining and Underground structures
Eurocode 8: Design of structures for earthquake resistance – Part 6: Towers, masts and chimneys	EN 1998-6:2005		
	EN1999	EN1999	
Eurocode 9: Design of aluminium structures - Part 1-1: General structural rules	EN 1999-1-1:2007	EN 1999-1-1	Eurocode 9: Design of aluminium structures - Part 1-1: General structural rules
Eurocode 9: Design of aluminium structures - Part 1-2: Structural fire design	EN 1999-1-2:2007	EN 1999-1-2	Eurocode 9: Design of aluminium structures - Part 1-2: Structural fire design
Eurocode 9: Design of aluminium structures - Part 1-3: Structures susceptible to fatigue	EN 1999-1-3:2007	EN 1999-1-3	Eurocode 9: Design of aluminium structures - Part 1-3: Structures susceptible to fatigue
Eurocode 9: Design of aluminium structures - Part 1-4: Cold-formed structural sheeting	EN 1999-1-4:2007	EN 1999-1-4	Eurocode 9: Design of aluminium structures - Part 1-4: Cold-formed structural sheeting
Eurocode 9: Design of aluminium structures - Part 1-5: Shell structures	EN 1999-1-5:2007	EN 1999-1-5	Eurocode 9: Design of aluminium structures - Part 1-5: Shell structures
		CEN/TS 19100	
		CEN/TS 19100-1	Design of glass structures. Part 1: Basis of design and materials
		CEN/TS 19100-2	Design of glass structures. Part 2: Design of out-of-plane loaded glass components
		CEN/TS 19100-3	Design of glass structures. Part 3: Design of in-plane loaded glass components and their mechanical joints
		CEN/TS 19100-4	Design of glass structures. Part 4: Glass selection relating to the risk of human injury. Guidance for specification
		CEN/TS 19101	
		CEN/TS 19101	Design of fibre-polymer composite structures
		CEN/TS 19102	
		CEN/TS 19102	Design of tensioned membrane structures



Aikataulu



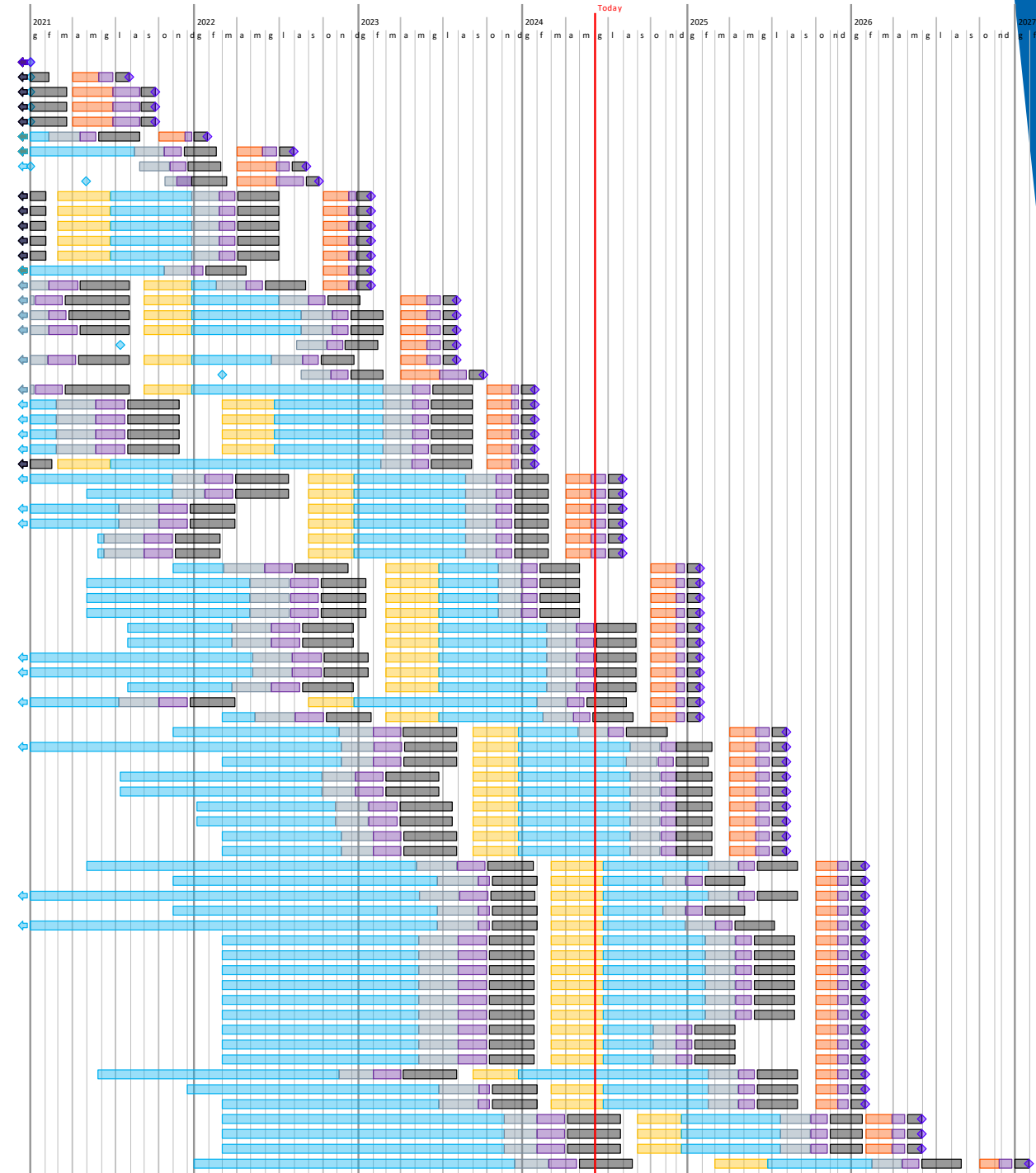
Standardoinnin vaiheet



Informal Enquiry -kommentointi

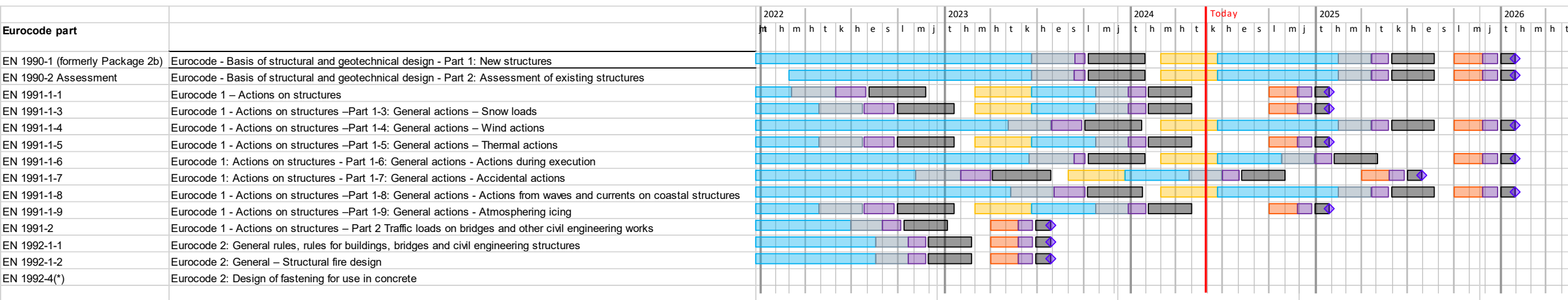
Eurocode part

	No. Pages	No. NDPs	start date	end date
CEN/TS 17440 Assessment	40		30.6.2018	24.3.2020
CEN/TS 19103(*)	58		1.1.2019	29.7.2021
prCEN/TS 19100-1 on structural glass	100		1.7.2018	23.9.2021
prCEN/TS 19100-2 on structural glass	80		1.7.2018	23.9.2021
prCEN/TS 19100-3 on structural glass	80		1.7.2018	23.9.2021
EN 1996-1-1	137	17	1.5.2018	28.1.2022
EN 1993-1-1	118	23	1.7.2018	29.7.2022
CEN/TS 1993-1-101	11		1.7.2018	26.8.2022
CEN/TS 19101 Fibre Polymer Composites	240	13	30.4.2021	23.9.2022
EN 1999-1-1	365	23	1.7.2020	27.1.2023
EN 1999-1-2	57	4	1.7.2018	27.1.2023
EN 1999-1-3	136	28	1.7.2018	27.1.2023
EN 1999-1-4	84	4	1.7.2018	27.1.2023
EN 1999-1-5	76	0	1.7.2018	27.1.2023
(Package 1 - Main text, A1,B,C,D,E,F)	120	105	1.5.2018	27.1.2023
(Package 2a - A2,G,H)	73	included in package 1	1.7.2020	27.1.2023
EN 1991-2	153	113	1.7.2018	28.7.2023
EN 1992-1-1	362	80	30.6.2020	28.7.2023
EN 1992-1-2	79	3	30.6.2020	28.7.2023
CEN/TR Bonded-in rods(*)	15		11.7.2021	28.7.2023
EN 1996-3	39	5	1.5.2020	28.7.2023
CEN/TS 19102 Tensioned membrane structures	100	10	1.3.2022	22.9.2023
EN 1991-1-2	68	7	1.7.2018	26.1.2024
EN 1993-1-13(*)	40		1.7.2020	26.1.2024
EN 1993-1-2	88	4	1.7.2020	26.1.2024
EN 1993-1-3	198	14	1.7.2020	26.1.2024
EN 1993-1-5	71	3	1.7.2020	26.1.2024
EN 1993-1-8	197	8	1.7.2018	26.1.2024
EN 1996-1-2	69	10	1.5.2020	29.7.2024
EN 1996-2	34	4	1.5.2021	29.7.2024
EN 1997-1	112	39	1.10.2020	29.7.2024
EN 1997-2	133	8	1.10.2020	29.7.2024
EN 1998-1-1	119	15	24.5.2021	29.7.2024
EN 1998-5	122	12	24.5.2021	29.7.2024
EN 1991-1-1	50	26	1.11.2021	28.1.2025
EN 1991-1-3	52	24	1.5.2021	28.1.2025
EN 1991-1-5	32	36	1.5.2021	28.1.2025
EN 1991-1-9	35	15	1.5.2021	28.1.2025
EN 1993-1-10	48	8	27.7.2021	28.1.2025
EN 1993-1-4	55	7	27.7.2021	28.1.2025
EN 1993-1-6	144	2	1.7.2020	28.1.2025
EN 1993-1-7	73	3	1.7.2020	28.1.2025
EN 1993-1-9	109	25	27.7.2021	28.1.2025
EN 1997-3	301	40	1.10.2020	28.1.2025
EN 1998-2	80	8	1.3.2022	28.1.2025
EN 1991-1-7	72	50	1.11.2021	29.7.2025
EN 1993-1-14(*)	42	13	1.7.2020	29.7.2025
EN 1993-5	133	14	1.3.2022	29.7.2025
EN 1995-1-1	450	19	11.7.2021	29.7.2025
EN 1995-1-2	150	2	11.7.2021	29.7.2025
EN 1995-2	80	9	7.1.2022	29.7.2025
EN 1995-3 Execution rules	65	0	7.1.2022	29.7.2025
EN 1998-3	221	6	1.3.2022	29.7.2025
EN 1998-4	119	10	1.3.2022	29.7.2025
EN 1991-1-4	200	76	1.5.2021	28.1.2026
EN 1991-1-6	34	8	1.11.2021	28.1.2026
EN 1991-1-8	230	24	1.7.2020	28.1.2026
EN 1991-3	52	5	1.11.2021	28.1.2026
EN 1991-4	180	7	1.7.2020	28.1.2026
EN 1993-1-11	70	19	1.3.2022	28.1.2026
EN 1993-2	110	56	1.3.2022	28.1.2026
EN 1993-3	74	23	1.3.2022	28.1.2026
EN 1993-4-1	134	11	1.3.2022	28.1.2026
EN 1993-4-2	53	13	1.3.2022	28.1.2026
EN 1993-6	69	15	1.3.2022	28.1.2026
EN 1994-1-1	130	3	1.3.2022	28.1.2026
EN 1994-1-2	114	3	1.3.2022	28.1.2026
EN 1994-2	96	10	1.3.2022	28.1.2026
EN 1998-1-2	357	13	24.5.2021	28.1.2026
EN 1990-1 (formerly Package 2b)	80		1.12.2021	28.1.2026
EN 1990-2 Assessment	40	18	1.3.2022	28.1.2026
EN 19100-1 on structural glass	100	18	1.3.2022	29.5.2026
EN 19100-2 on structural glass	80	19	1.3.2022	29.5.2026
EN 19100-3 on structural glass	80	18	1.3.2022	29.5.2026
EN 1995-1-3(*)	80		1.1.2022	28.1.2027



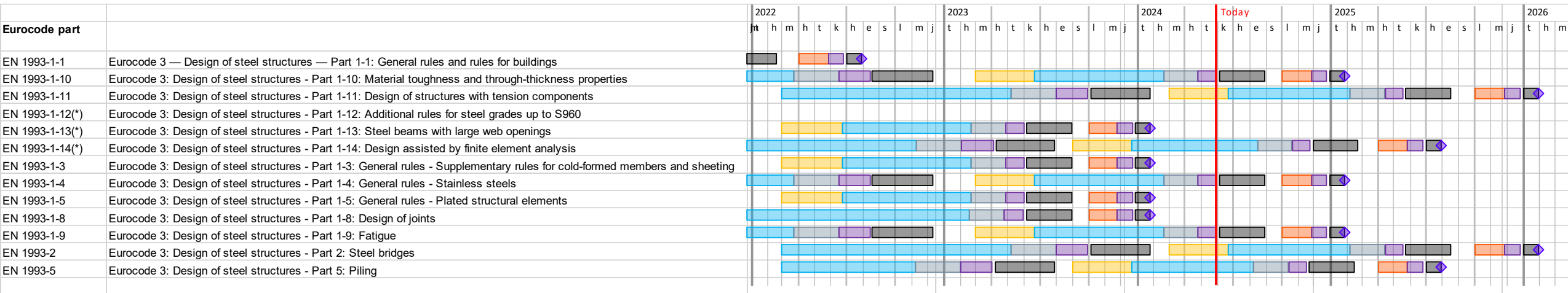
EN 1990 & EN 1991 & EN 1992

- = Enquiry-vaihe
- = Formal Vote-vaihe
- = DAV (julkaisu)



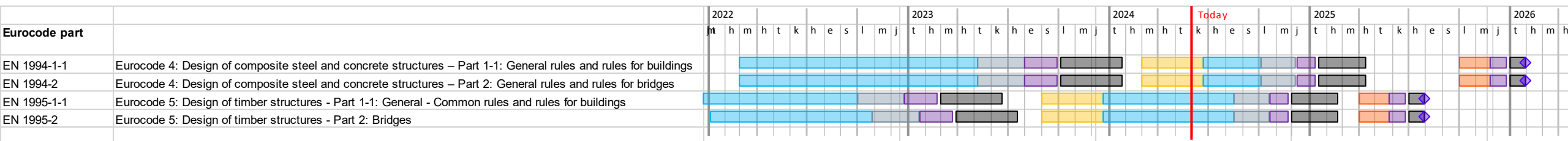
EN 1993

- = Enquiry-vaihe
- = Formal Vote-vaihe
- = DAV (julkaisu)



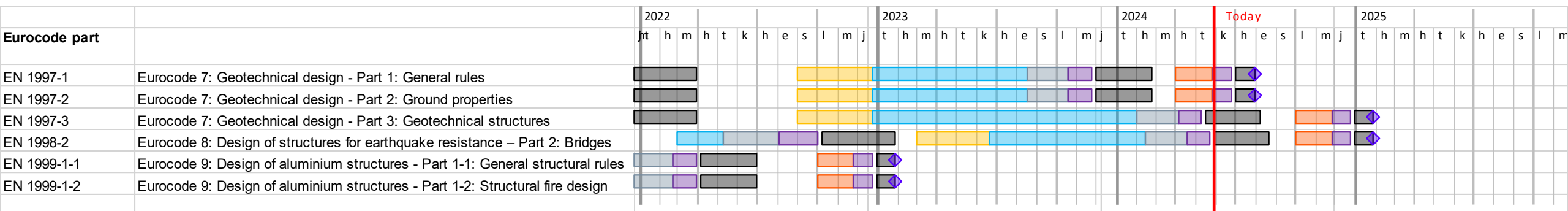
EN 1994 & EN 1995

-  = Enquiry-vaihe
-  = Formal Vote-vaihe
-  = DAV (julkaisu)



EN 1997 & EN 1998 & EN 1999

- = Enquiry-vaihe
- = Formal Vote-vaihe
- ◆ = DAV (julkaisu)





Mitä muuttuu



Muutokset EN 1990

- Standardi jakautuu kahteen osaan
 - Uudet rakenteet
 - Olemassa olevat rakenteet

1st Generation

EN1990:2002 +A1

2nd Generation

EN1990-1 New Structures

EN1990-2 Assessment of Existing
Structures

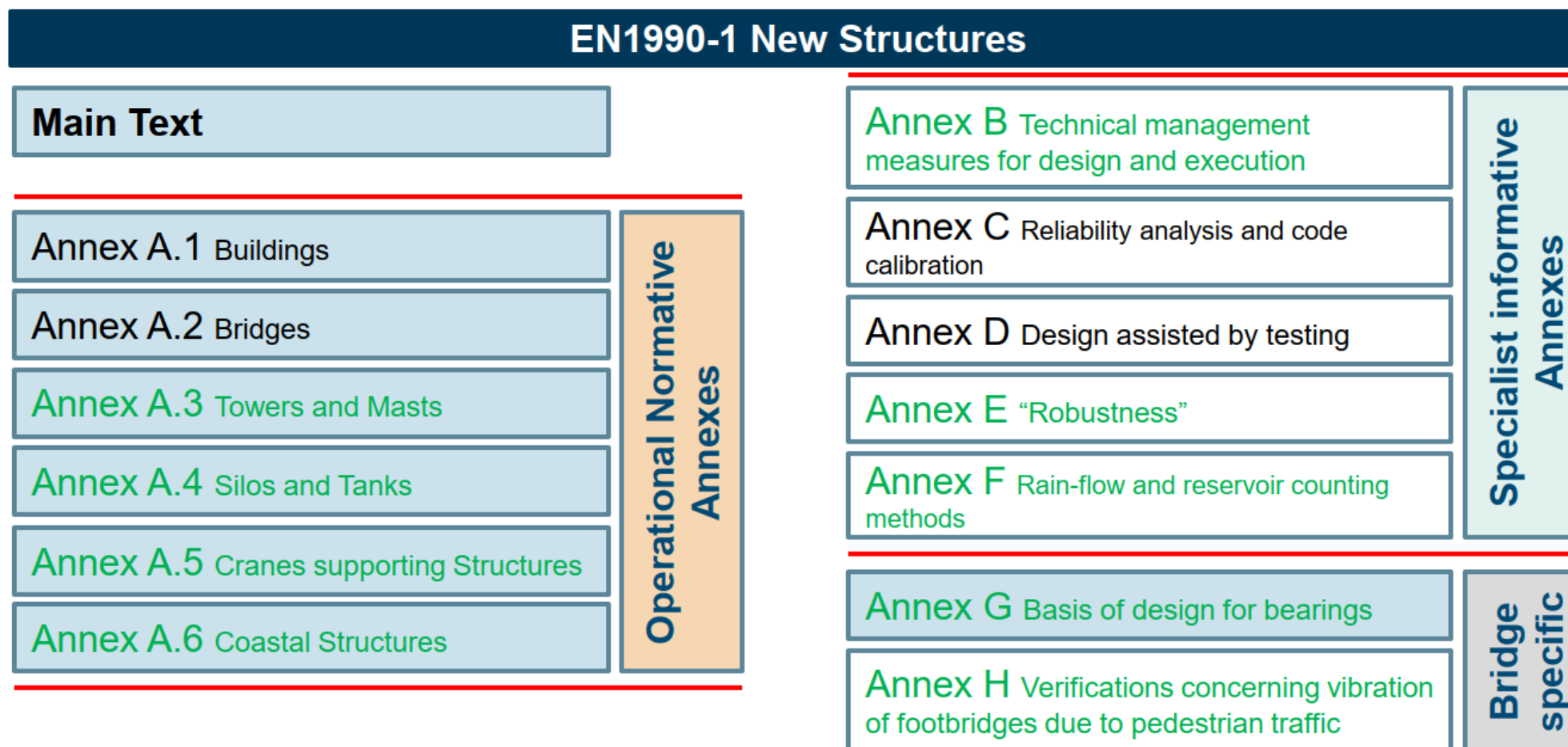
Muutokset EN 1990



Väylävirasto
Trafikledsverket

Normative

Informative



Muutokset EN 1990



Väylävirasto
Trafikledsverket

Normative

Informative

EN1990-2 Assessment of Existing Structures

Main Text

1. Introduction
2. Scope
3. Normative References
4. Basic Requirements
5. General Rules
6. Assessment scope and objectives
7. Assessment approach
8. Basic Variables and Updating
9. Structural modelling, updating and analysis
10. Verification using quantitative assessment methods
11. Verification using qualitative assessment methods
12. Interventions

Annex A Additional guidance on assessment of existing structures

Muutokset EN 1990-1

- Seuraamusluokkien määrää lisätty

Table A.2.1 (NDP) — Examples of bridges in different consequence classes

Consequence class ^a	Description of consequence	Examples
CC4 ^b	Highest	
CC3b	High (upper class)	Where an increased level of reliability is required, when specified by the relevant authority or, where not specified, agreed for a specific project by the relevant parties
CC3a	High (lower class)	Railway bridges on main railway lines, bridges over main railway lines, bridges over and under major roads
CC2	Normal	Bridges not in other consequence classes
CC1	Low	Short span bridges on local roads with little traffic (provided they do not span over main railway lines or major roads)
CC0 ^b	Lowest	Elements other than structural, see 3.1.1.7.

^a CC3b corresponds to an increased level of reliability compared to CC3a.
^b For provisions concerning CC0 and CC4, see 4.3.

Table A.2.11 (NDP) — Consequence factors for bridges and associated geotechnical structures

Consequence class (CC)	Description of consequences	Consequence factor k_F
CC3b	High (upper class)	1,1
CC3a	High (lower class)	1,0
CC2	Normal	1,0
CC1	Low	0,9

^a The provisions in Eurocodes cover design rules for structures classified as CC1 to CC3, see 4.3.

Muutokset EN 1990-1

- SET A – EQU staattinen tasapaino -> VC2 (Combined structural resistance and static equilibrium / uplift)
- SET B – STR/GEO rakenneosien kestävyys ja geotekninen kantavuus -> VC1 (Structural resistance)
- SET C – STR/GEO -> VC3&VC4 (Geotechnical design)



Väylävirasto
Trafikledsverket

Table A.2.10 (NDP) — Partial factors on actions and effects for verification cases VC1 – VC4 for persistent and transient (fundamental) design situations for bridges and associated geotechnical structures

Action or effect ⁿ				Partial factors γ_F and γ_E for verification cases				
Type	Group	Symbol	Resulting effect	Structural resistance	Combined structural resistance and static equilibrium / uplift		Geotechnical design	
Verification case				VC1 ^a	VC2(a) ^a	VC2(b) ^a	VC3 ^a	VC4 ^a
Permanent action (G_k)	All ^c	γ_G	unfavourable	$1,35k_F$	$1,35k_F$	1,0	1,0	G_k is not factored
	Water ^m	γ_{Gw}	/destabilizing	$1,2k_F$	$1,2k_F$	1,0	1,0	
	Settlement ^o	$\gamma_{G,set}$		$1,2k_F^h$	$1,2k_F^h$	1,0	1,0	
	All ^c	$\gamma_{G,stab}$	stabilizing ^d	not used	$1,25^b$	1,0	not used	
	Water ^m	$\gamma_{Gw,stab}$			$1,0^b$	1,0	used	
	All ^c	$\gamma_{G,fav}$	favourable ^e	1,0	1,0	1,0	1,0	
	Settlement ^o	$\gamma_{G,set,fav}$		0	0	0	0	0
Prestressing (P_k)		γ_P^g						
Variable action (Q_k)	Road / pedestrian traffic		unfavourable	$1,35k_F$	$1,35k_F$	$1,35k_F$	1,15	$Q_{k,red}^f$
	Rail traffic (except as below) ⁱ			$1,45k_F$	$1,45k_F$	$1,45k_F$	1,25	
	SW/2, gr16, gr17 ^j			$1,2k_F$	$1,2k_F$	$1,2k_F$	1,0	
	Other ^k	γ_Q		$1,5k_F$	$1,5k_F$	$1,5k_F$	1,3	
	Variable water ^l	γ_{Qw}		$1,35k_F$	$1,35k_F$	$1,35k_F$	1,15	
	All	$\gamma_{Q,fav}$	favourable	0				
Effects of actions (E)		γ_E	unfavourable	γ_E is not applied				$1,35k_F$
		$\gamma_{E,fav}$	favourable					1,0

Muutokset EN 1991-1-5

- Sillan alkulämpötilan määrittämiselle esitetään huomioon otavaksi jatkossa vaihteluväli
 - Suomessa vastaava menettely esitetty TOSS:ssa laakereiden ja liikuntasaumojen liikevarojen määrittämisessä

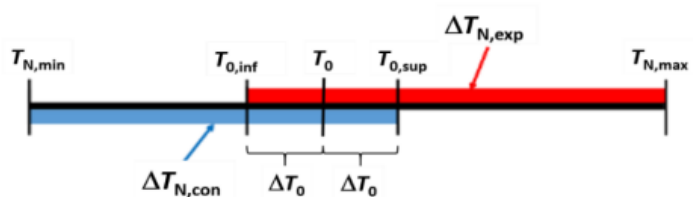


Figure 8.1 — Characteristic value of the maximum contraction ($\Delta T_{N,con}$) and expansion ($\Delta T_{N,exp}$) range of the uniform bridge temperature component

(3) The effects of both contraction over the range from $T_{0,sup}$ down to $T_{N,min}$ and expansion over the range from $T_{0,inf}$ up to $T_{N,max}$ should be considered. Upper and lower bound values of the initial bridge temperature ($T_{0,sup}$ and $T_{0,inf}$) should be used given as:

$$T_{0,sup} = T_0 + \Delta T_0 \quad (8.3)$$

$$T_{0,inf} = T_0 - \Delta T_0 \quad (8.4)$$

ΔT_0 is a range of initial bridge temperature.

NOTE The value of ΔT_0 can be set by the National Annex.

(4) As an alternative to (3), upper and lower bound values of the initial bridge temperature ($T_{0,sup}$ and $T_{0,inf}$) may be as specified by the relevant authority or, where not specified, agreed for a specific project by the relevant parties.

(5) The characteristic value of the maximum contraction range of the uniform bridge temperature component, $\Delta T_{N,con}$ (see Figure 8.1) should be considered and taken as given in Formula (8.5)

$$\Delta T_{N,con} = T_{0,sup} - T_{N,min} \quad (8.5)$$

(6) The characteristic value of the maximum expansion range of the uniform bridge temperature component, $\Delta T_{N,exp}$ (see Figure 8.1) should be considered and taken as given in Formula (8.6)

$$\Delta T_{N,exp} = T_{N,max} - T_{0,inf} \quad (8.6)$$

Muutokset EN 1991-2

- Uudet kuormakaaviot geoteknisille rakenteille
 - Tieliikenteen osalta sama kuorma, joka on jo esitetty NCCI 1:ssä.
 - Rautatieliikenteelle lisätty oma kaavio

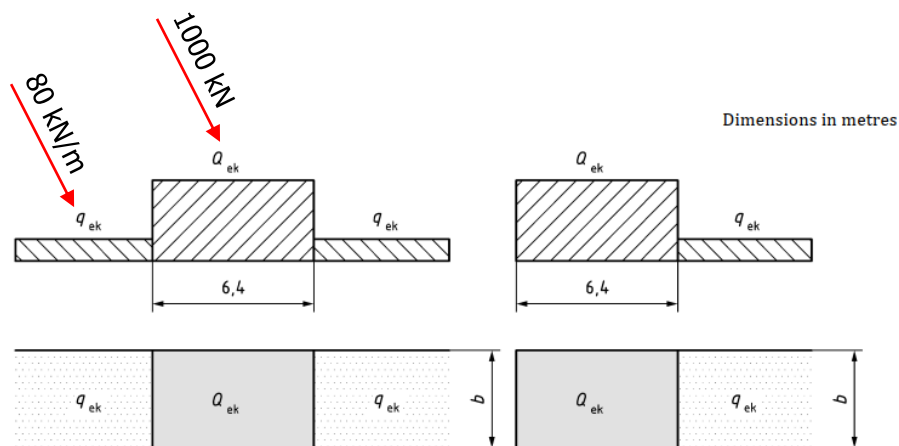
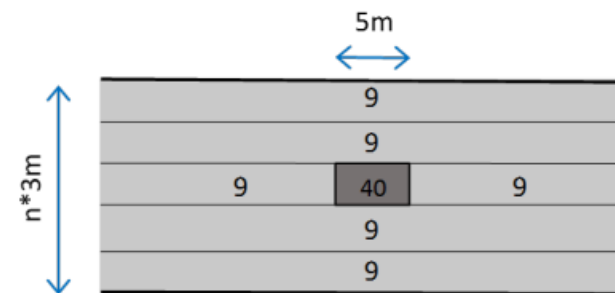


Figure 8.28 — Equivalent load arrangement for Load Model 71 for geotechnical structures (a, left) Single concentrated patch load and uniformly distributed load on both sides (b, right) Single concentrated patch load and uniformly distributed load on one side only



Väylävirasto
Trafikledsverket



Kuva 6. Tien liikennekuormat [kPa].

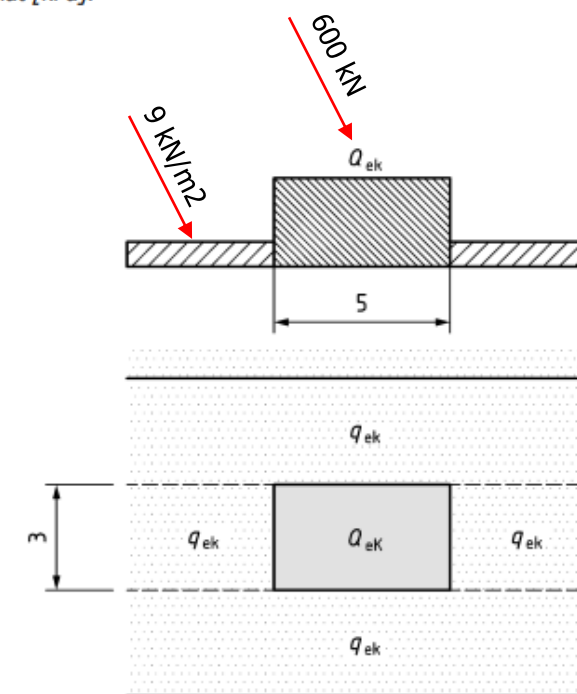


Figure 6.11 — Road traffic load model for geotechnical structures

Muutokset EN 1991-2



Väylävirasto
Trafikledsverket

- Kevyen liikenteen siltojen värähtelylaskentaa päivitetty uusimman tutkimustiedon valossa

Table G.1 — Traffic classes and harmonic load models

Traffic Class	Description	(G.4)	(G.5)	(G.6)
		Pedestrian stream P/m^2 (A)	Pedestrian group n_w (B)	Jogging group n_j (C)
TC 1	Very weak traffic	0,1	1	0
TC 2	Weak traffic	0,2	2	0
TC 3	Dense traffic	0,5	4	1
TC 4	Very dense traffic	1,0	8	2
TC 5	Exceptionally dense traffic	1,5	16	4

d = density [P/m^2 = pedestrians on loaded surface]

n_w = number of pedestrians in a group

n_j = number of joggers in a group

NOTE 1 As an example:

TC 2(A) = load model of pedestrian stream with pedestrian density of $0,2 \times P/m^2$

TC 4(B) = load model of group of 8 pedestrians

TC 3(C) = load model of a single jogger

NOTE 2 Further guidance for the selection of design situations, depending on the usage and location of the bridge, is presented in EN 1990:2023, A.2.8.3 and Annex H.

For pedestrian stream load model minimum of 15 persons on the bridge deck should be assumed unless otherwise defined in the National Annex or for the individual project.

Table G.2 — Parameters for load model of TC 1 to TC 5

P_w		
N		
Vertical 280	Longitudinal 140	Lateral 35
Reduction coefficient ψ_w		
<p>Key</p> <p>— 1. Harmonic</p> <p>----- 2. Harmonic</p> <p>X frequency</p>		
Equivalent number n' of pedestrians on the loaded surface S for traffic classes TC1 to TC5:		
TC 1 to TC 3 (density $d < 1,0 P/m^2$):		
$n' = \frac{10,8\sqrt{\xi \cdot n}}{S} [1/m^2] \quad (G.2)$		
TC 4 to TC 5 (density $d \geq 1,0 P/m^2$):		
$n' = \frac{1,85\sqrt{n}}{S} [1/m^2] \quad (G.3)$		
where		
ξ		is the structural damping ratio;
d		is the density of pedestrians [P/m^2] (see Table G.1);
n		is the number of pedestrians on the loaded surface S ($n = d \times S$);
S		is the area of loaded surface.

Muutokset EN 1992

Clause	Title	Pages (FprEN)
	Title page, Table of contents, European foreword, Introduction	20
1; 2; 3	Scope; normative references; terms, definitions and symbols	46
4	Basis of design	4
5	Materials	12 + Annex C
6	Durability	12
7	Structural analysis	19 + Annex O
8	Ultimate Limit State (ULS)	52
9	Serviceability Limit State (SLS)	14 + Annex S
10	Fatigue	4 + Annex E
11	Detailing of reinforcement and post-tensioning tendons	24
12	Detailing of members and particular rules	22
13	Additional rules for precast concrete elements and structures	12
14	Plain and lightly reinforced structures	6
Total main part		247

Muutokset EN 1992

Normative

Informative

Uusi tai merkittävästi päivitetty



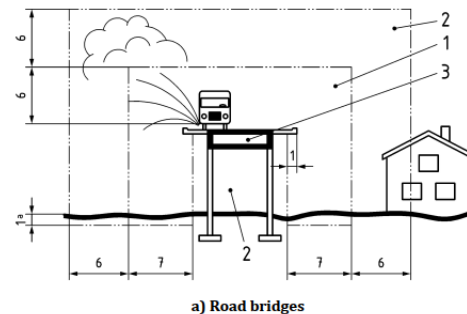
Väylävirasto
Trafikledsverket

Annex	Title	Pages
A	Adjustment of partial factors for materials	8
B	Time dependent behaviour of materials: strength, creep, shrinkage and elastic strain of concrete and relaxation of prestressing steel	11
C	Requirements for materials	9
D	Evaluation of early-age and long-term cracking due to restraint	5
E	Additional rules for fatigue verification	5
F	Safety formats for non-linear analysis	5
G	Design of membrane-, shell- and slab elements	6
H	Guidance on design of concrete structures for water-tightness	4
I	Assessment of Existing Structures	19
J	Strengthening of Existing Concrete Structures with CFRP	20
K	Bridges	16
L	Steel Fibre Reinforced Concrete Structures	14
M	Lightweight aggregate concrete structures	3
N	Recycled aggregates concrete structures	3
O	Simplified approaches for second order effects	9
P	Alternative cover approach for durability	3
Q	Stainless reinforcing steel	3
R	Embedded FRP reinforcement	12
S	Minimum reinforcement for crack control and simplified control of cracking	4

Total pages **159**

Muutokset EN 1992-1-1 Annex K Bridges

- Tarkennuksia ja lisäyksiä
 - Säilyvyys
 - Käyttörajatila
 - Jännitetyt sillat (ulkoisilla tai sisäisillä tartunnattomilla jänteillä), riippusillat, vinoköysisillat
- Säännöt minimiraudoituksen määritykseen, jotta vältetään hauras murtuminen
 - Aikaisemmin ohjeistettiin määrittämään säännöt kansallisissa liitteissä
- Selvennetty, että silloille voidaan tehdä haluttaessa erilaiset kansalliset valinnat kuin taloille



Muutokset EN 1993-2

- Parannuksia/tarkennuksia sauvojen sivuttaisen nurjahduksen ja kiepahduksen laskemisen yksinkertaistettuun menetelmään
- Laakereiden tekniset eritelvät (Annex A) siirretty standardiin 1990-1 Annex G
- Liikuntasauvojen tekniset eritelvät (Annex B) siirretty standardin 1990-1 Annex A.2:een
- Uusi Annex A langerpalkkisiltojen riipputankojen suunnitteluun



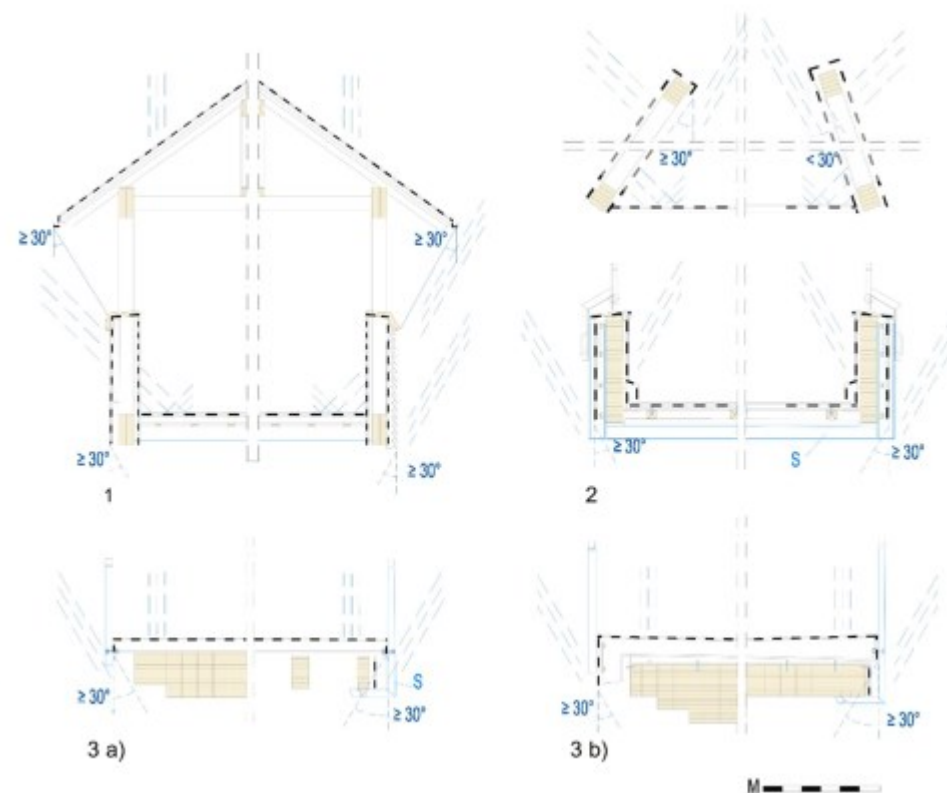
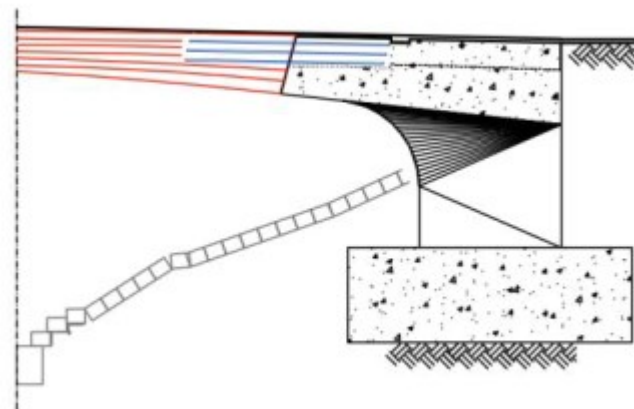
Muutokset EN 1994-2

- Standardin 1994-1-1 kanssa päällekkäiset yleisohjeistukset poistettu ja lisätty viittaukset standardin 1994-1-1 kohtiin.
 - Sivumäärä puolittunut
- Paljon korjauksia ja selkeytyksiä käyttäjien palautteen perusteella



Muutokset EN 1995-2

- Suunnitteluohjeistusta laajennettu
 - Säilyvyys ja rakenteiden yksityiskohdat
 - Liikuntasaumattomat sillat
- Tarkennuksia suunnitteluohjeisiin
 - Puu-betoni liittorakenteet
 - Viilupuu (LVL)
 - Värähtely ja vaimennus
 - Väsytyt



Key

M Sealant or weather resisting layer

S Steel frame

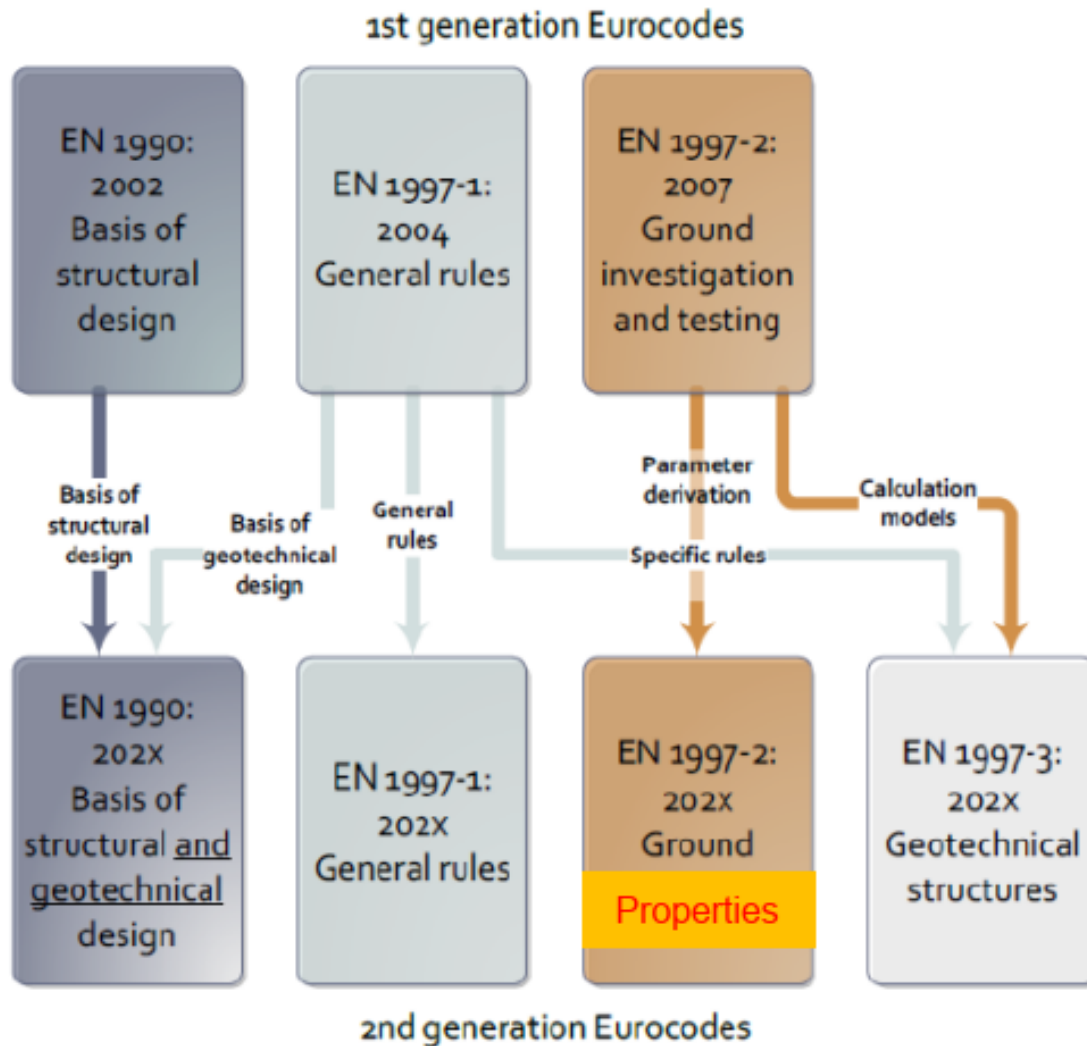
1 Covered road bridge (with traffic inside)

2 Arch bridge (up) and trough bridge (down) with deck located at the base of the main bridge structure

3 Bridges with deck located above the main bridge structure

Figure D.1 — Examples of protected timber bridges

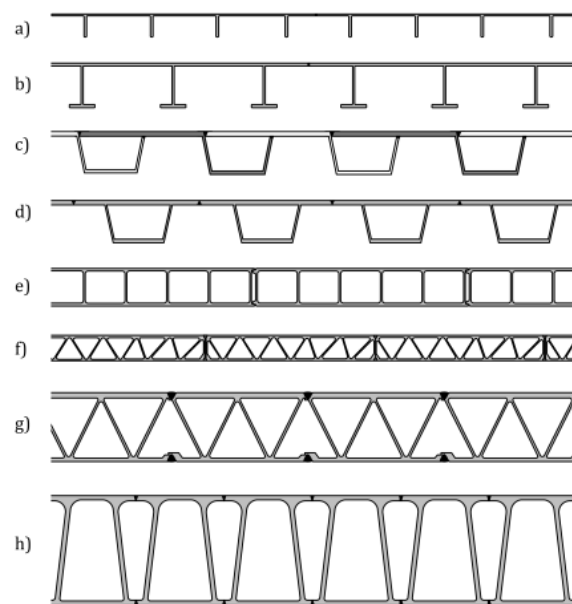
Muutokset EN 1997



Paaluryhmät & paalulaatat
Maanpainerakenteet
Pohjaveden hallinta
Pohjanvahvistukset
Maanalaus
Kalliopultit
Ankkurit
Liuskat
Jne.

Muutokset EN 1999

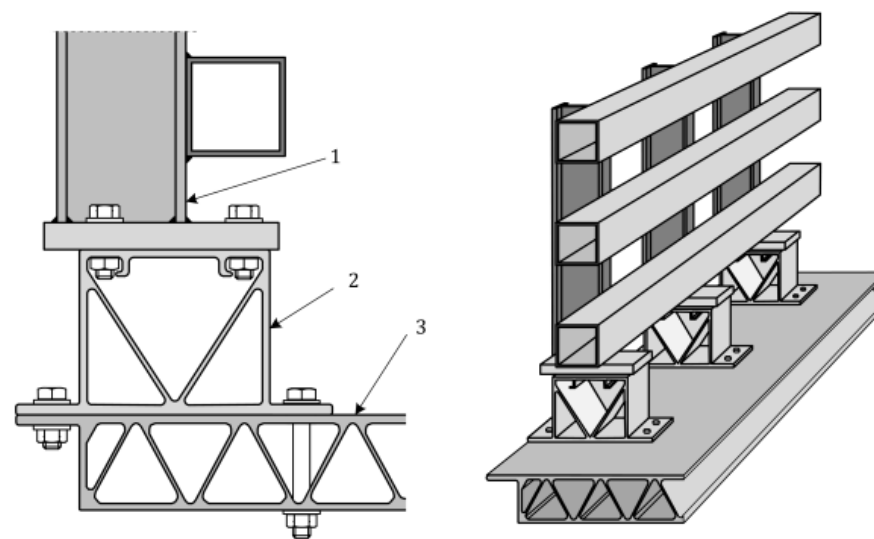
- Standardiin 1999-1-1 lisätty Annex S, joka käsittelee siltoja



Key

- a) - b) open configuration
- c) - d) semi-closed configuration made of open sections or folded sheet
- e) - h) closed configuration

Figure S.2 — Stand-alone extruded deck



Key

- 1 traffic barrier
- 2 extrusion fuse element
- 3 aluminium deck

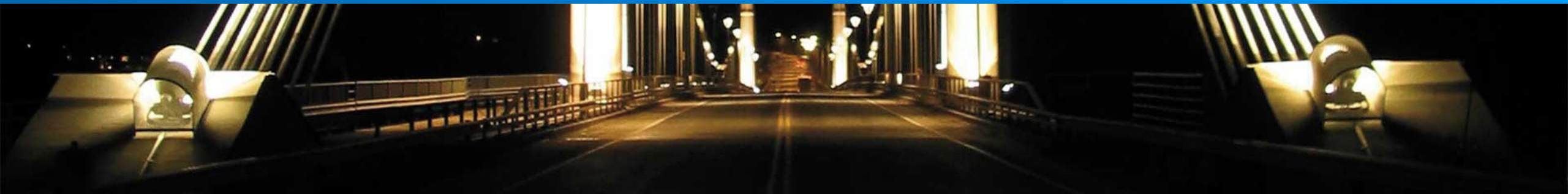
Figure S.9 — Examples of connection of traffic barrier to aluminium deck

Annex S (normative) Aluminium bridges .

- S.1 Use of this Annex.....
- S.2 Scope and field of application
- S.3 Terms, definitions and symbols
- S.4 Basis of design
- S.5 Materials
- S.6 Durability
- S.7 Structural Analysis.....
- S.8 Ultimate limit states
- S.9 Serviceability limit states
- S.10 Fatigue
- S.11 Detailing.....



Käyttöönotto



Lukitut päivämäärät

- DAV = Date of availability
 - Päivä, jolloin lopullinen standardi on käytettävissä jäsenmailla virallisilla kielillä
 - Viimeistään 30.3.2026
- DoP = Date of Publication
 - Päivä, jolloin standardit on otettava kansallisella tasolla käyttöön
 - Viimeistään 30.9.2027
- DoW = Date of withdrawal
 - Päivä, jolloin 2. sukupolven eurokoodin kanssa ristiriidassa olevat kansalliset standardit on poistettava (=1.sukupolvi)
 - Viimeistään 30.3.2028



Valmiusaste

- 2. sukupolven eurokoodeja on tähän mennessä julkaistu SFS:n toimesta (18 + 5) kpl
- NÄITÄ EI SAA KUITENKAAN VIELÄ KÄYTTÄÄ SUUNNITTELUSSA!!



- SFS-EN 1990:2023:en
Eurocode. Basis of structural and geotechnical design
- CEN/TS 17440:2020:en
Assessment and retrofitting of existing structures
- SFS-EN 1991-1-2:2024:en
Eurocode 1. Actions on structures – Part 1-2: Actions on structures exposed to fire
- SFS-EN 1991-2:2023:en
Eurocode 1. Actions on structures. Part 2: Traffic loads on bridges and other civil engineering works
- SFS-EN 1992-1-1:2023:en
Eurocode 2. Design of concrete structures. Part 1-1: General rules and rules for buildings, bridges and civil engineering structures
- SFS-EN 1992-1-2:2023:en
Eurocode 2. Design of concrete structures. Part 1-2: Structural fire design
- SFS-EN 1993-1-1: 2022:en
Eurocode 3. Design of steel structures. Part 1-1: General rules and rules for buildings
- CEN/TS 1993-1-101:2022:en
Eurocode 3: Design of steel structures. Part 1-101: Alternative interaction method for members in bending and compression
- SFS-EN 1993-1-2:2024:en
Eurocode 3. Design of steel structures. Part 1-2: Structural fire design
- SFS-EN 1993-1-3:2024:en
Eurocode 3. Design of steel structures. Part 1-3: Cold-formed members and sheeting
- SFS-EN 1993-1-5:2024:en
Eurocode 3. Design of steel structures. Part 1-5: Plated structural elements
- SFS-EN 1993-1-8:2024:en
Eurocode 3. Design of steel structures. Part 1-8: Joints
- SFS-EN 1993-1-13:2024:en
Eurocode 3. Design of steel structures. Part 1-13: Beams with large web openings
- SFS-EN 1996-1-1:2022:en
Eurocode 6. Design of masonry structures. Part 1-1: General rules for reinforced and unreinforced masonry structures
- SFS-EN 1996-3:2023:en
Eurocode 6. Design of masonry structures. Part 3: Simplified calculation methods for unreinforced masonry structures
- SFS-EN 1999-1-1:2023:en
Eurocode 9. Design of aluminium structures. Part 1-1: General rules
- SFS-EN 1999-1-2:2023:en
Eurocode 9. Design of aluminium structures. Part 1-2: Structural fire design
- SFS-EN 1999-1-3:2023:en
Eurocode 9. Design of aluminium structures. Part 1-3: Structures susceptible to fatigue
- SFS-EN 1999-1-4:2023:en
Eurocode 9. Design of aluminium structures. Part 1-4: Coldformed structural sheeting
- SFS-EN 1999-1-5:2023:en
Eurocode 9. Design of aluminium structures. Part 1-5: Shell structures
- CEN/TS 19101:2022:en
Design of fibre-polymer composite structures
- CEN/TS 19102:2023:en
Design of tensioned membrane structures
- CEN/TS 19100-4:2024:en
Design of glass structures. Part 4: Glass selection relating to the risk of human injury. Guidance for specification

Kansalliset liitteet

Laadinta aloitettu

- 1990-1
- 1991-2

Valmistelussa

- 1992-1-1
- 1997-1
- 1997-2
- 1997-3

• Aloittamatta

- 1990-2
- 1991-1-4
- 1991-1-5
- 1991-1-6
- 1991-1-7
- 1993-1-11
- 1993-2
- 1994-2
- 1995-2
- (1999-1-1)



NCCI -ohjeet

- Non-contradictory complementary information
 - Eurokoodin ja kansallisen liitteen kanssa ristiriidaton lisäohjeistus
- 1. sukupolven eurokoodien NCCI-ohjeiden laadinta otti paljon aikaa (2009-2016)
- Nykyiset NCCI-ohjeet päivitetään vastaamaan 2. sukupolven eurokoodeja
- Ohjeen nimestä tulevaisuudessa NCCI-lyhenne pois?
 - Nimiehdotuksia otetaan vastaan

1 soveltamisohje
ormat ja suunnitteluperusteet - NCCI 1

Eurokoodin soveltamisohje
Betonirakenteiden suunnittelu - NCCI 2

Päivitystyö

- Kansalliset liitteet
 - Kansalliset valinnat
 - Vertailulaskelmia
 - Diplomitöitä
 - Kansalliset lisäohjeistukset
 - NCCI
 - TOSS
 - Jne.
- Tarvitaan resursseja tulevaisuudessa





Väylävirasto
Trafikledsverket