

Muoviteollisuus ry, Pirjo Pietikäinen

Asiantuntija

Pitkän yliopistouran (TKK ja Aalto-yliopisto) jatkoksi avautui mielenkiintoinen mahdollisuus päästä työskentelemään lähemmin Suomen muoviteollisuuden hyväksi.

Ydinosaaminen: Pidän ihmisistä ja työskentelemisestä heidän kanssaan. Olen ollut muovien (polymeerien) kanssa tekemisissä koko urani ajan lisäksi olen utelias etsimään uutta tietoa.

Elämään on hyvä saada sisällytettyä laulua ja tanssia työjuttujen vastapainoksi.



MUOVITEOLLISUUS RY
KOMPOSIITTIJAOSTO



MUOVITEOLLISUUS RY
COMPOSITES GROUP
Finnish Plastics industries Federation

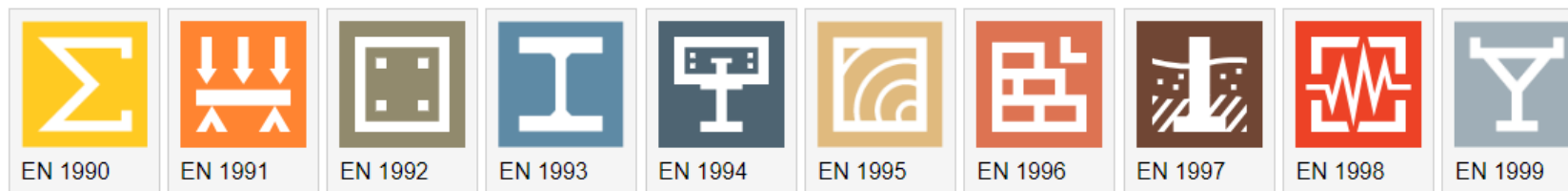
CEN TS 19101

Kohti komposiittien eurokoodeja

Pirjo Pietikäinen
Muoviteollisuus ry, Komposiittijaosto

Kiitokset Eric Moussiaux
Exel Composites

Eurocodes family



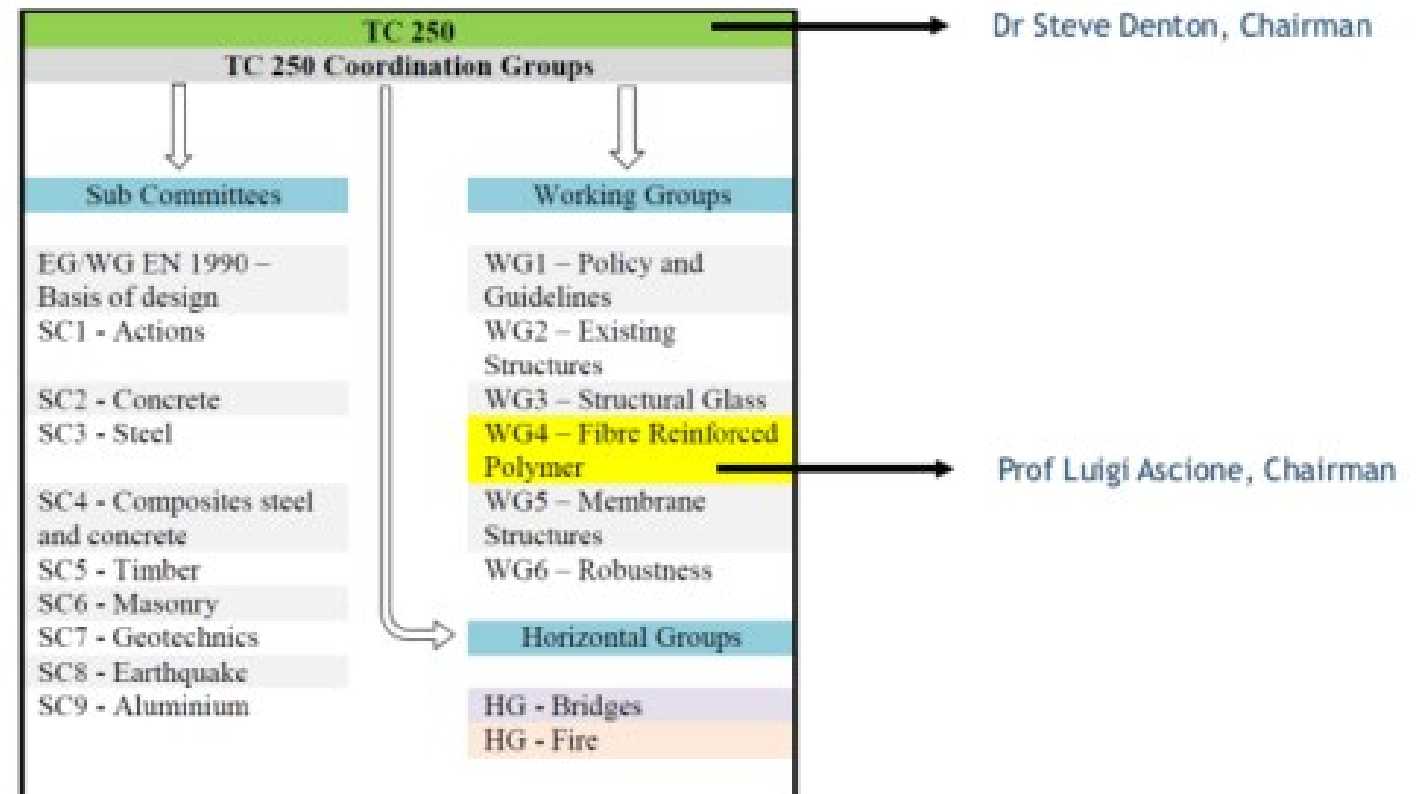
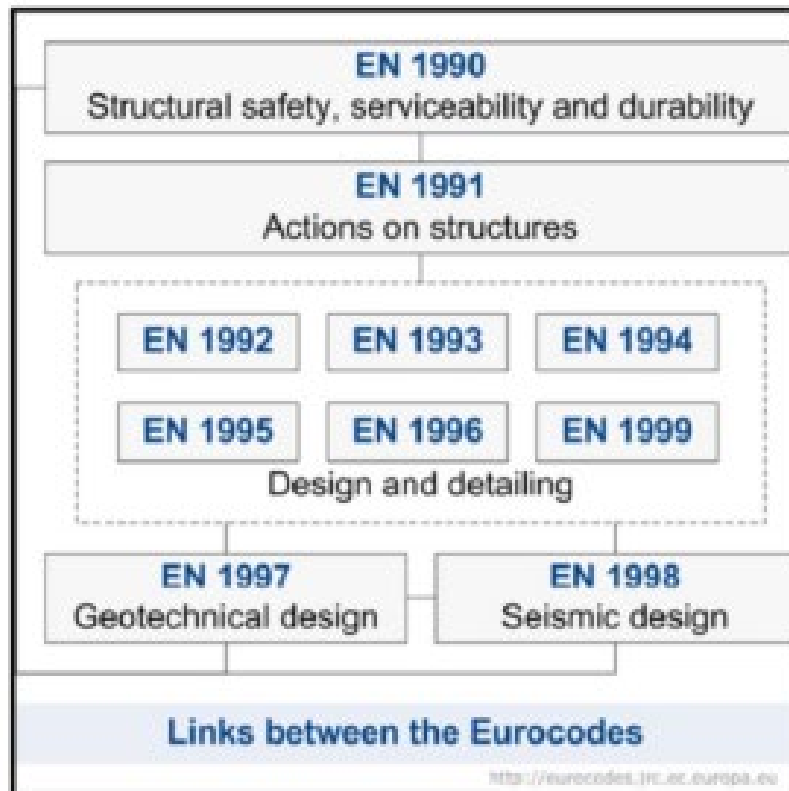
Mitä eurokoodit ovat?

- Kokoelma suunnittelustandardeja
 - Kantavat rakenteet (rakennukset, sillat)
 - 58 osaa
 - Muodostavat yhdessä toteutus- ja tuotestandardien kanssa yhtenäisen kokonaisuuden rakenteiden suunnittelua ja toteutusta varten
- CEN TC 250
 - Alakomiteat
 - Jokaista osaa varten toimii Suomessa seurantaryhmä
- Kansalliset liitteet
 - NDP, Nationally Determined Parameters



Mitä Eurokoodit ovat?

- Kaikki rakenteet Euroopassa
- Päivitystyö loppusuoralla





Mihin eurokoodeja tarvitaan?



Euroopan standardointijärjestelmä

Design Standards: the Eurocodes

Material and Product Standards:
steel, concrete, structural bearings,
barriers, parapets, etc.

European Technical Approvals:
expansion joints, prestressing tendons,
etc.

Execution standards: execution of concrete and steel structures, etc.

Test standards: testing of concrete, masonry units, fire tests, etc.

European Standards (EN) family



CEN TS 19101: Design of fibre-polymer composite structures

Eurocodes Suite :

- EN 1990 Eurocode 0 : Basis of structural design
- EN 1991 Eurocode 1 : Actions on structures
- EN 1992 Eurocode 2 : Design of concrete structures
- EN 1993 Eurocode 3 : Design of steel structures
- EN 1994 Eurocode 4 : Design of composite steel and concrete structures
- EN 1995 Eurocode 5 : Design of timber structures
- EN 1996 Eurocode 6 : Design of masonry structures
- EN 1997 Eurocode 7 : Geotechnical design
- EN 1998 Eurocode 8 : Design of structures for earthquake resistance
- EN 1999 Eurocode 9 : Design of aluminium structures
- EN 19101 Eurocode xx : Design of fibre-polymer composite structures

CEN/TC 250

Date: 2020 -10

prEN 19101: 2020

Secretariat:

Design of fibre-polymer composite structures

Bemessung und Konstruktion von Tragwerken aus Faserverbundwerkstoffen

Calcul des structures en matériaux composites

CEN TS 19101 (Technical Specification)

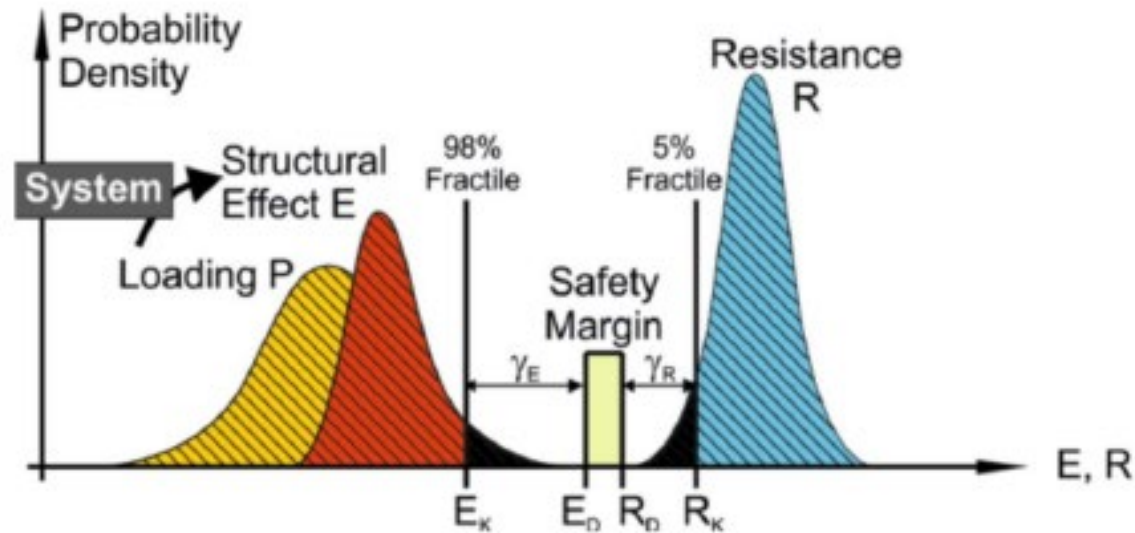
1	Scope	A	Creep coefficients
2	Normative references	B	Indicative values of material properties for preliminary design
3	Terms, definitions and symbols		
4	Basis of design	C	Buckling of orthotropic laminates and profiles
5	Materials	D	Structural fire design
6	Durability	E	Bridge details
7	Structural analysis		
8	Ultimate limit states		
9	Serviceability limit states		
10	Fatigue		
11	Detailing		
12	Connections and joints		

Sovellettavissa suurimmalle osalle komposiittien työstömenetelmiä ja materiaaleja

- pr TS 19101 is applicable to
 - Buildings, bridges and other civil engineering structures
 - Permanent and temporary structures
 - All-composite and hybrid-composite structures
 - Pultruded profile beam and column structures, 3D molded structures (eg infusion), sandwich panels
 - Bolted and bonded joints
 - Glass, carbon, basalt and aramid fibres
 - Thermoset resins and adhesives
 - Polymeric foam, balsa wood cores
- pr TS 19101 is not applicable to :
 - Cable stayed structures
 - Internal (rebars) and external concrete reinforcements
 - Honeycomb cores
 - Thermoplastic resins
 - Natural fibres



Turvallisuusmarginaalit



$$E_d \leq R_d$$

where E_d and R_d are the design values, in the considered direction, of the generic action and corresponding capacity (in terms of resistance or deformation) respectively, within a generic limit state.



$$R_d = \frac{1}{\gamma_{Rd} \cdot \gamma_m} R \{ \eta_{c,i} \cdot X_{k,i}; a_d \}$$

CEN TS 19101 - Kehitys

- CEN TC 250 hyväksyi TS-statusen 21.7.2022
- Julkaistiin lokakuussa 2022
 - Myynnissä useissa maissa
 - Moni maa ottamassa kansalliseksi standardiksi
- TS-vaihe kestää 2-3 vuotta
- Kokeilu- ja kommentointivaiheen jälkeen TS → Eurokoodi

- CEN TC 250 näyttänyt vihreää valoa toteutuskodein kehittämislle
 - Execution code for composite structures

Seuraava vaihe: Execution Standards



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Execution Standards related to EN Eurocodes

ENV 13670	Execution of concrete structures
EN 1090	Execution of steel structures – Technical requirements
EN 1536	Execution of special geotechnical work – Bored piles
EN 1537	Execution of special geotechnical work – Ground anchors
EN 14199	Execution of special geotechnical work – Micro piles
EN 12063	Execution of special geotechnical work – Sheet-pile walls
EN 12699	Execution of special geotechnical work – Displacement piles
EN 1011	Recommendations for arc welding of steels
EN 12732	Gas supply systems – Welding steel pipe work – functional requirements
EN 25817	Arc-welded joints in steel: Guidance on quality levels for imperfections
EN 30042	Arc-welded joints in aluminium and its weldable alloys – Guidance on quality levels for imperfections



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Käytettävissä kaikki dokumentit

TECHNICAL SPECIFICATION **CEN/TS 19101**
SPÉCIFICATION TECHNIQUE
TECHNISCHE SPEZIFIKATION October 2022

ICS 91.010.30

English Version

Design of fibre-polymer composite structures

Calcul des structures en matériaux composites
Berechnung von Tragwerken aus Faserverbund-
Kunststoffen

This Technical Specification (CEN/TS) was approved by CEN on 22 August 2022 for provisional application.
The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.
CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.
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EUROPEAN COMMITTEE FOR STANDARDIZATION
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COMMENTARY TO FprCEN/TS 19101: 2021 "Design of fibre-polymer composite structures"

BACKGROUND DOCUMENTS IN SUPPORT TO THE IMPLEMENTATION,
HARMONIZATION AND FURTHER DEVELOPMENT OF THE EUROCODES


J. R. Correia | T. Keller | J. Knippers | J. T. Mottram | C. Paulotto | J. Sena-Cruz | L. Ascione




31 MARCH 2022




EUROCODES
prCEN/TS 19101



Design of fibre-polymer composite structures



A collection of worked examples



28 September 2022



Lisätietoja

Mukana standardin kehitystyössä

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