



Webinar:

# Få værktøjer til at arbejde med CØ I byggeriet

8. marts 2024

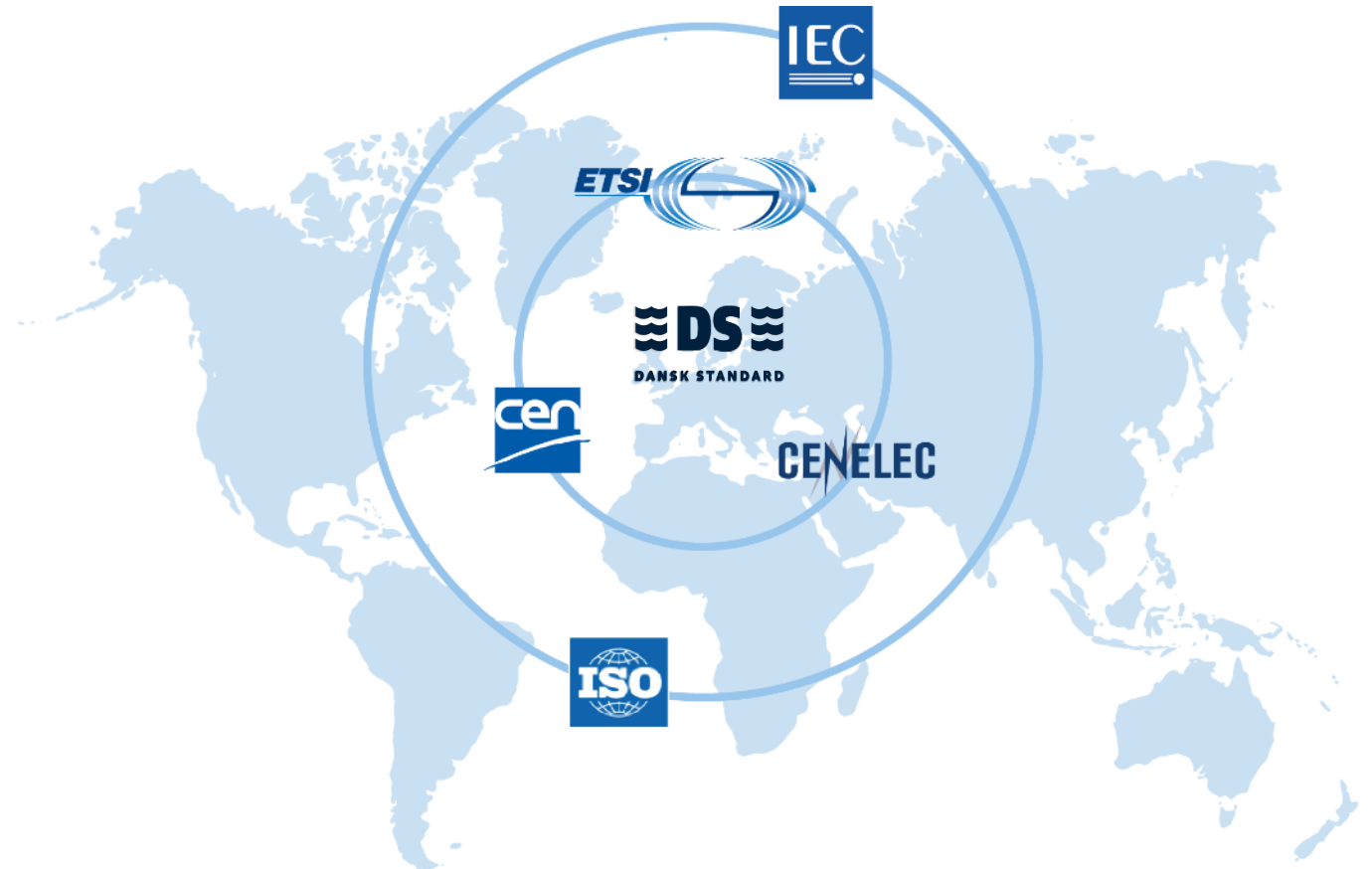
Starter kl. 10:00

- et samarbejde mellem VCØB og DS

# Dagsorden

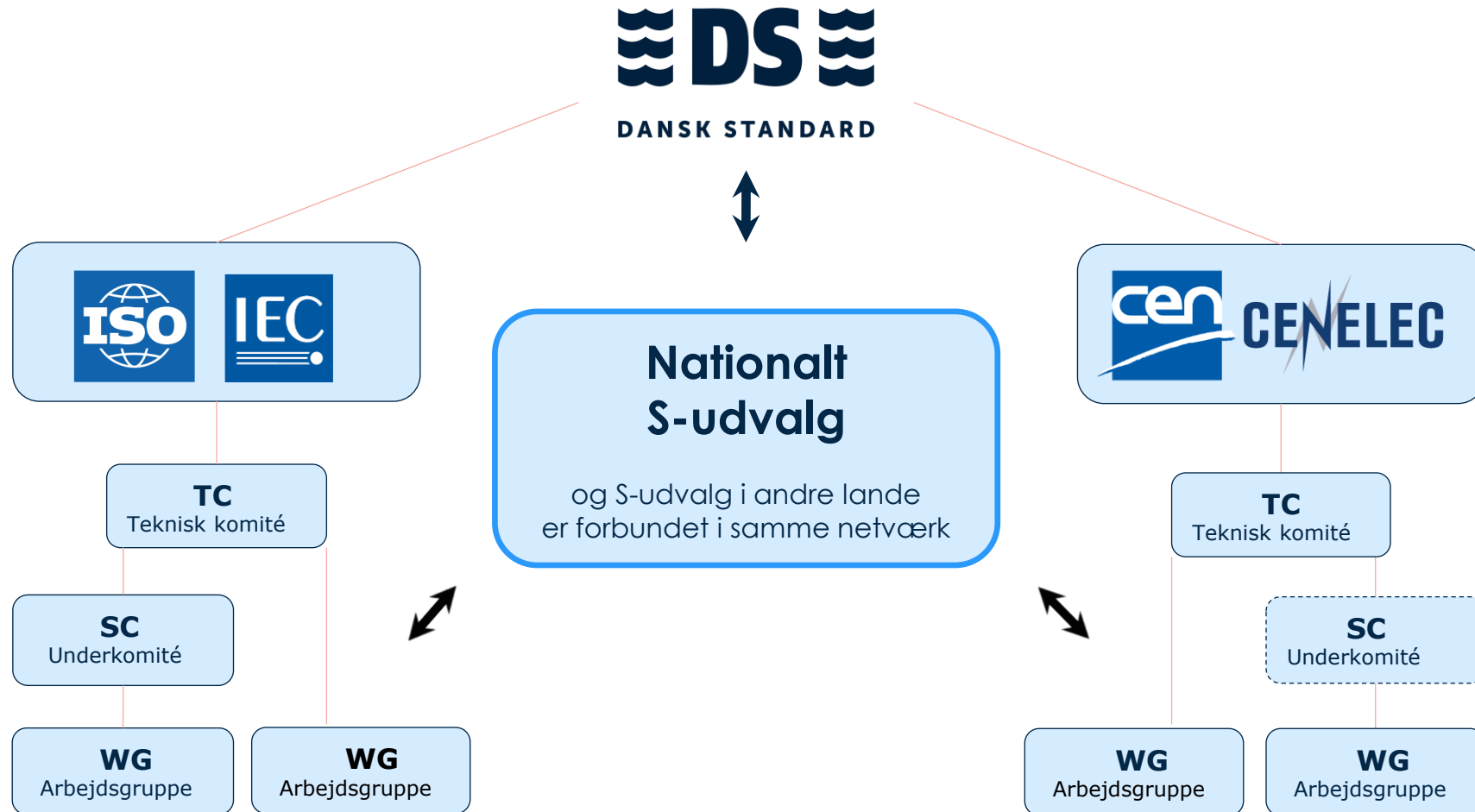
1. Velkommen og præsentation af dagsorden for webinar
2. Standardisering inden for CØ i Byggeriet v/ Charlotte Forsingdal, seniorkonsulent, Dansk Standard
3. Status samt proces for udvikling af standarden, "Framework, principles, and definitions" v/Lisbeth Ottosen, professor, head of section for Materials and Durability, DTU SUSTAIN
4. Task Group-forberedelse af forslag til ny/nye standarder v/Martha Lewis, Head of Materials, Henning Larsen Architects
5. Om at deltage i en arbejdsgruppe, og hvordan StructuralReuse spiller ind i standardiseringsarbejdet v/ Karoline Fogh Gustafsson, Teamlead & Konsulent hos Lendager
6. Hvordan kan du bruge VCØB som værktøj i omstilling til cirkularitet? v/Lise Lyngfelt Molander, forretningschef for bæredygtighed, Teknologisk Institut
7. Spørgsmål fra Chat

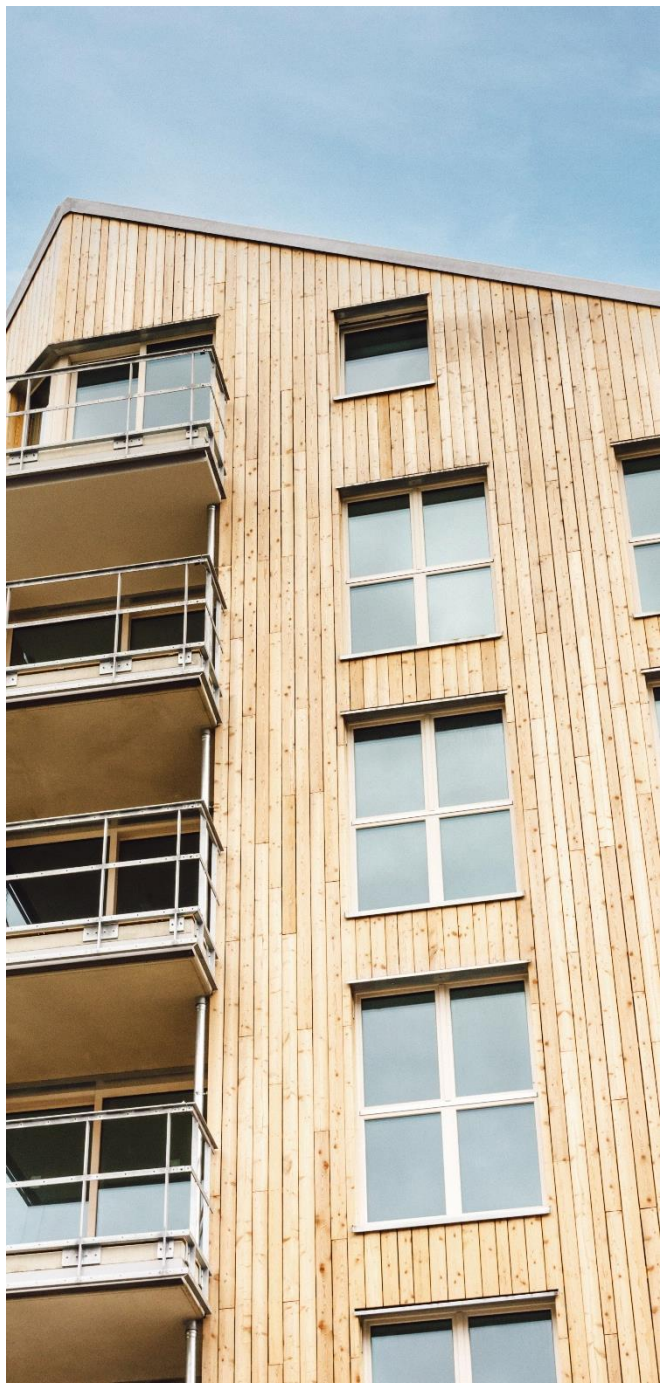
# Dansk Standard – en erhvervsdrivende fond – udviklingen går mod flere fælles europæiske og internationale standarder



Danske standarder specielt indenfor byggeriet – henvisninger fra Bygningsreglementet

# Hvordan hænger nationale udvalg sammen med omverdenen?



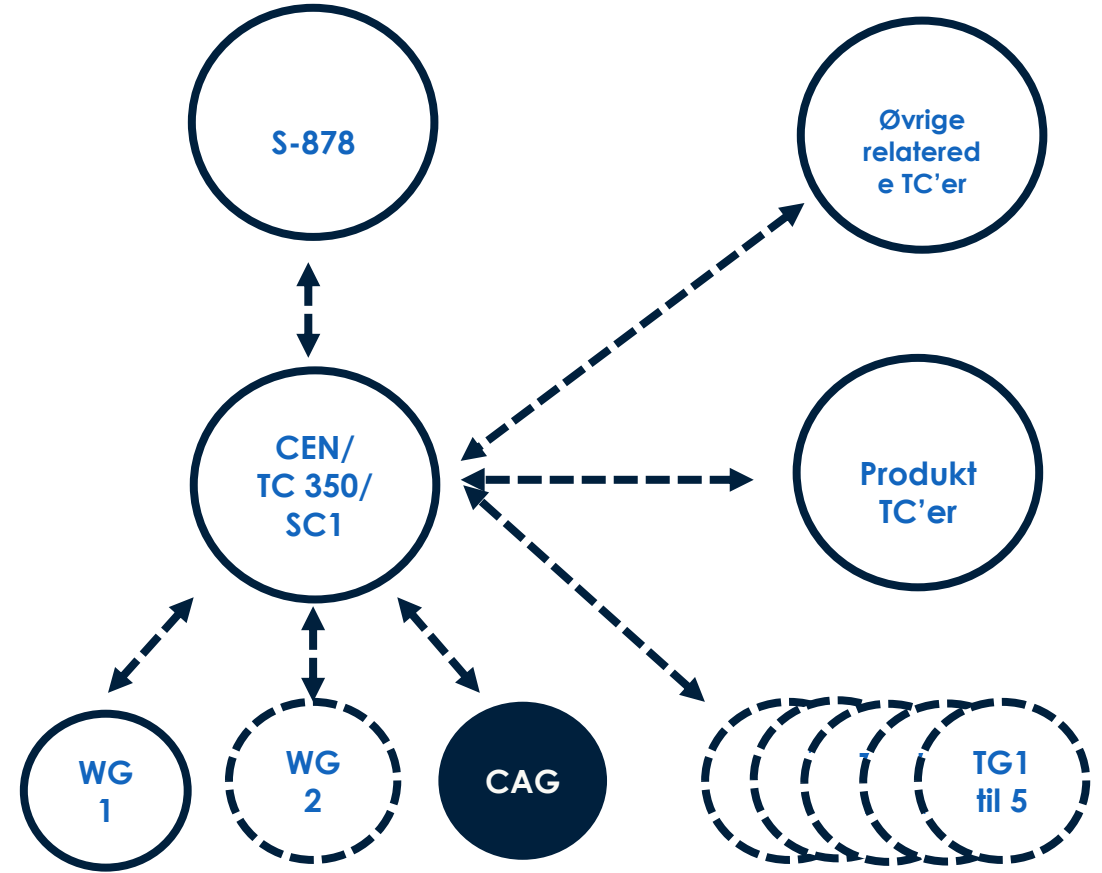


# Organisering – standardisering - CØ byggeri

Forperson  
Susanne Kuehn

Chair Kasper  
Guldager Jensen

Convenor Lisbeth  
Ottoen



CEN TC350/SC1 CIRCULAR ECONOMY IN THE CONSTRUCTION SECTOR  
CEN/TC/350/SC1/WG 1 Framework, principles, and definitions  
CAG: Chair Advisory Group

Task Group leader  
TG1 Martha Lewis

# S-878 Cirkulær Økonomi i Byggeriet

Repræsentanter fra 34 organisationer, institutioner og virksomheder

Danske Arkitekt Virksomheder  
Foreningen for Rådgivende Ingeniører  
Teknologisk Institut  
DTU Byg  
Miljømærkning Danmark  
ETA Danmark  
Rådet for Bæredygtigt Byggeri  
Force Technology  
Dansk Brand- og sikrings Institut  
Henning Larsen Architects  
Saint-Gobain  
Rockwool  
C.G. Jensen  
WindowMaster  
Velux  
Nordic Waterproofing  
Troldekt

Social- og Boligstyrelsen  
Statens Byggeforskningsinstitut  
Århus Universitet  
NCC Danmark  
Vejdirektoratet  
Molio  
Home.Earth  
Dansk Byggeri Industri  
Spæncom  
Marlon Tørmørtel  
Dansk Tegl  
JELD-WEN Danmark  
Trap Rose & Ekblad  
Xella Danmark  
3XN  
H+H Danmark  
Veltek

Flere S-878 medlemmer deltager aktivt i de europæiske arbejdsgrupper og task Groups

# Hvad er opgaven for Task Groups?

Overveje og komme med anbefalinger til om der skal:

- nedsættes en WG (forslag til titel, scope, convenor)
- opstartes et eller flere PWI'er (forslag til projekt leder/ledere)

Anbefalingerne skal være aligned med:

- De øvrige SC1 TG's
- Øvrigt pågående arbejde i CEN/TC 350 og CEN/TC 350/SC1
- Relevant EU lovgivning og andre EU aktiviteter
- Resultatet og indhold i Gap analysen
- Diskussionsoplægget til plenarmødet
- Drøftelserne på plenarmødet

# TASK GROUPS

1. **Circularity related parts to a product, material and building passports/log-books (Denmark)**  
Martha Lewis (Task Group Leader); Support: Charlotte Forsingdal (DS)
2. **Circularity assessment (The Netherlands)**  
Flora Anvarifar (Task Group Leader); Support: Merel Wagner (NEN)
3. **Pre-demolition and pre-redevelopment audits and evaluation (UK)**  
Gillian Hobbs (Task Group Leader); Support: Colin McKerracher (BSI)
4. **Horizontal standard/Technical Report for re-use of construction, products, and materials (Sweden)**  
Markus Beckman (Task Group Leader); Support: Annika Almqvist and Laura Linnala (SIS)
5. **Horizontal deliverables for design for circularity at all levels for construction (The Netherlands)**  
Evert Schut (Task Group Leader); Support: Merel Wagner (NEN)





# Proceslinje for Task Groups



Lisbeth M. Ottosen, DTU Sustain, Convenor CEN/TC 350/SC 1/WG1

# Status samt proces for udvikling af standarden ”Framework, principles, and definitions”



Brussels, 2.12.2015  
COM(2015) 614 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**Closing the loop - An EU action plan for the Circular Economy**



Brussels, 11.3.2020  
COM(2020) 98 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**A new Circular Economy Action Plan  
For a cleaner and more competitive Europe**



Contents lists available at ScienceDirect

Resources, Conservation & Recycling

journal homepage: [www.elsevier.com/locate/resconrec](http://www.elsevier.com/locate/resconrec)



Review

Conceptualizing the circular economy: An analysis of 114 definitions

Julian Kirchherr\*, Denise Reike, Marko Hekkert



*“We have gathered 114 circular economy definitions”*



# ISO/FDIS 59004

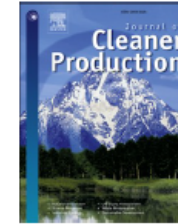
## Circular economy

Vocabulary, principles and guidance for implementation

Status : **Under development**

Contents lists available at [ScienceDirect](#)

Journal of Cleaner Production

journal homepage: [www.elsevier.com/locate/jclepro](http://www.elsevier.com/locate/jclepro)

Review

Circular economy in the built environment: A systematic literature review and definition of the circular construction concept



Felipe Ossio<sup>\*</sup>, Carlos Salinas, Héctor Hernández

*“The construction industry is still in the early stages of adopting this concept, and a clear and unified definition is needed for Circular Construction (CC) in the built environment”*



# Standardization

## – Circular economy in the Construction sector

- CEN/TC 350/SC 1 - Circular Economy in the Construction Sector
- WG1: Horizontal framework standard: Circular Economy – Terminology, Principles and Framework for Implementation (out in 2024)



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	8.8.1 Material level, 8.8.2 Related to building elements and products, 8.8.3 At the level of construction works		

# Why the three different levels?

- Levels:
  - Material
  - Product
  - Construction work

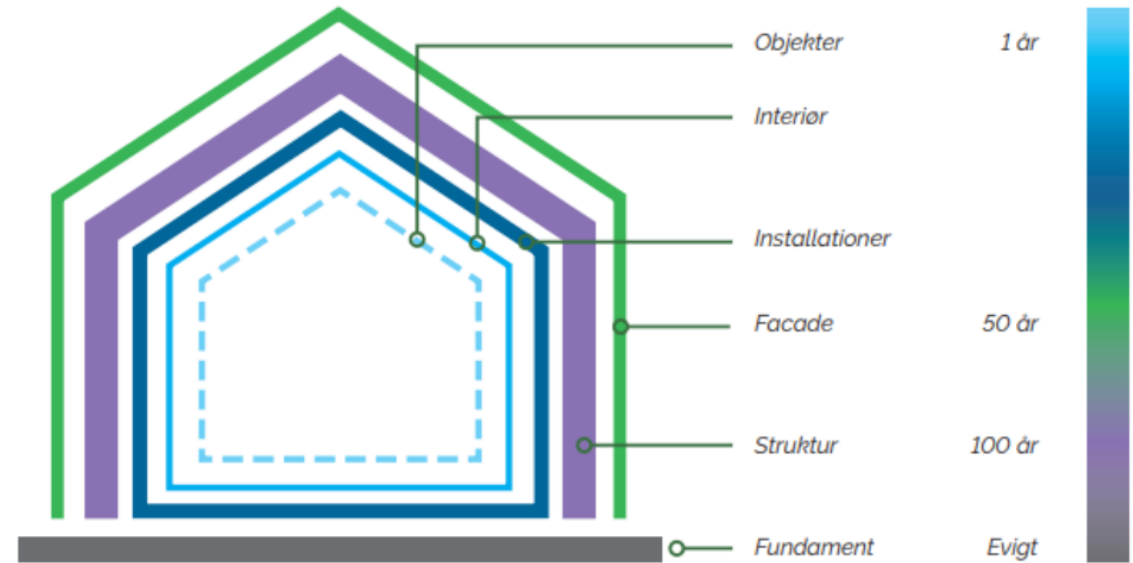


Illustration 3: Regeringens Klimapartnerskaber, Bygge og Anlægssektoren, side 18, Steward Brands lagmodel

Den tredje illustration er Steward Brands klassiske lagmodel. Den model kan man bruge til at se på, hvilke bygningsdele man vil prioritere. *Fra Håndbog i cirkulær økonomi, Byggeri København 2021*

Materials du not have a lifetime

	<b>Principle</b>	<b>Objectives</b>
1	<b>Prevent the depletion of primary raw materials</b> by construction products and their use in construction by design	Limit the depletion of stocks of primary raw materials as part of natural resources, enabling the availability of resources for future generations by increasing the use of renewable and recycled materials and re-used construction products decreasing the use of primary resources
2	<b>Eliminate waste and emissions</b> caused by construction products and their use in construction through design for circularity	Limit the environmental impacts resulting from the primary raw materials throughout subsequent material cycles. Eliminate emissions to air, soil and water
3	<b>Protect and regenerate natural systems.</b>	Limit land use for primary raw materials extraction (both non-renewable and renewable) and for landfill Prevent degradation of ecosystems as a result of resource extraction Regenerate ecosystems that have been degraded as a result of resource extraction
4	<b>Extend service life</b> of construction works, construction products and parts to allow multiple use cycles for as long as functional requirements are fulfilled	Reduce depletion of primary stocks Retain functional, technical and economic value
5	<b>Retain value</b> Decouple economic activity from the consumption of finite resources by retaining functional, material and economic value from previous cycles	Retain functional, technical, environmental and economic value over multiple use cycles Eliminate the use of persistent, toxic and bio accumulative hindering recycling options

# Table 9: Actions for implementation of circular economy principles for construction products (not prioritized) **SKITSE**

Circular action by design	Refuse	Critical mindset. Does the product fulfill a real need and is there a need for the function?
	Prioritize	Prioritize products <ul style="list-style-type: none"> <li>• made from raw materials with lowest environmental impact (e.g. made from recycled materials, least toxic compounds)</li> <li>• designed with reduced material use (through e.g. typology optimization)</li> <li>• That comes with a circular strategy (designed for long lifetime, <a href="#">multiple lifetimes</a> and reuse through design for disassembly)</li> </ul>
Circular action by life cycle management	Extend each lifecycle	<ul style="list-style-type: none"> <li>• Maintenance and repair to keep original function</li> <li>• Refurbish to bring up-to-date</li> </ul>
	<b>Multiple lifecycles (use cycles)</b>	<ul style="list-style-type: none"> <li>• Reuse of products in the same function through multiple lifecycles (same owner through e.g. leasing systems or multiple owners through sale from material platforms)</li> </ul>
Reuse of parts and recycling of materials	Remanufacture and repurpose	<ul style="list-style-type: none"> <li>• <a href="#">Enhance the quality, performance, and lifespan of the product.</a></li> <li>• Reuse parts of discarded construction products in new products with the same or a different purpose</li> </ul>
	Recycle materials	<ul style="list-style-type: none"> <li>• Process the products into high grade raw materials which can be used in new construction products.</li> <li>• Remove hazardous compounds from polluted components to fulfill today's requirements before recycling.</li> </ul>

# Indsatsområder for udbredelse



# Status of work in SC 1/WG 1

## NWIP ballot in CEN/TC 350

Deadline for NWIP ballot 22.  
April 2024 and (hopefully)  
activation of PWI

01

02

## Drafting of full coherent document

Currently SC 1/WG 1 is  
drafting a full, coherent  
document for discussion at  
next meeting

## SC 1/WG 1 meeting

SC 1/Wg 1 meeting 11 April  
with the aim of finalising  
document to dispatch as

WD

03

04

## Dispatch WD

Dispatch WD for  
commenting in CEN/TC 350  
in the beginning of May (4  
weeks)

## Face-to-face meeting 17. June 2024

Go through and process  
comments at face-to-face  
meeting 17. June in  
Stockholm

05

## CEN ENQ.

Prepare version for CEN  
ENQ. in autumn 2024

Tak fordi I lyttede 😊

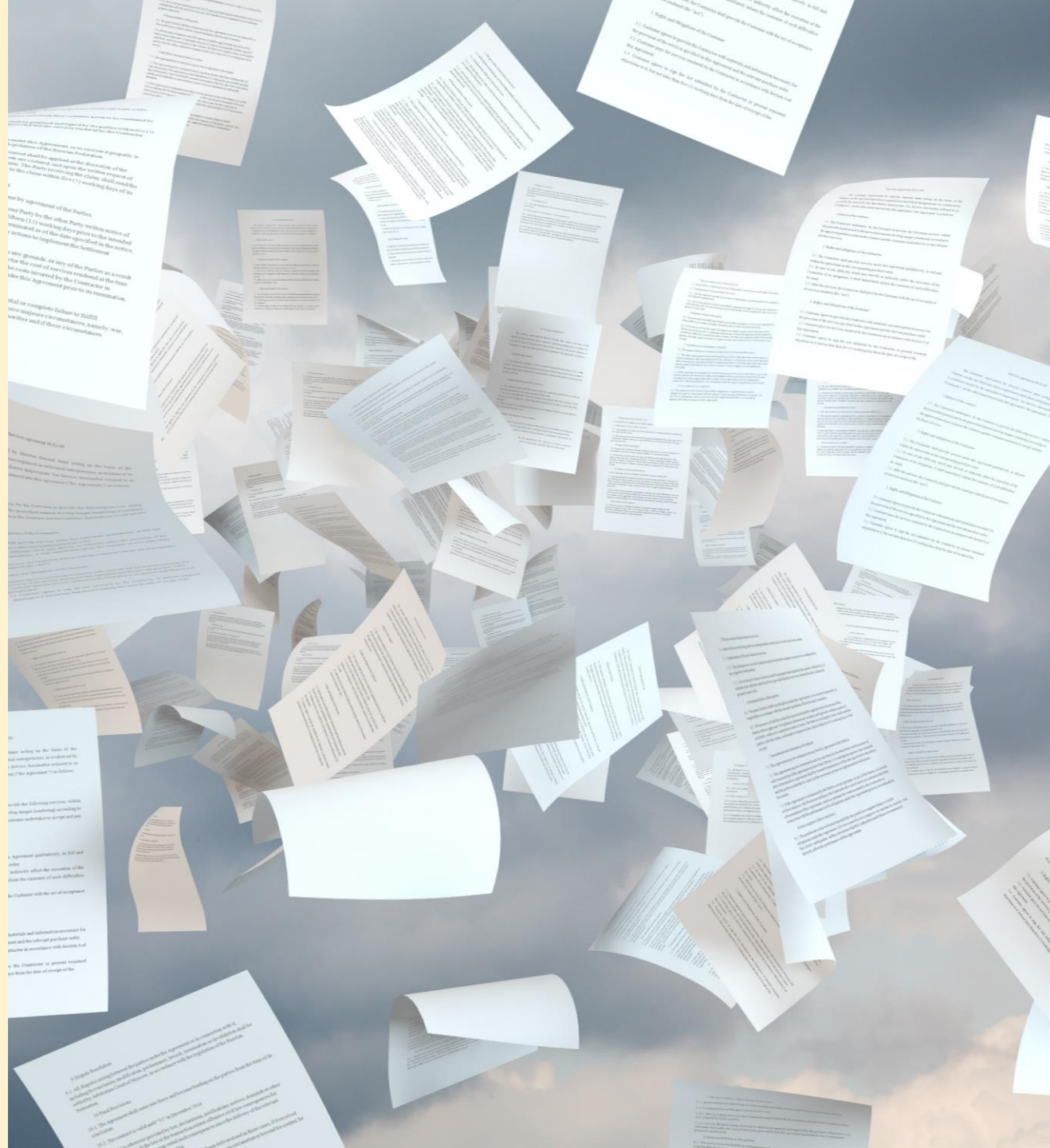


CØ & product- og bygningspas

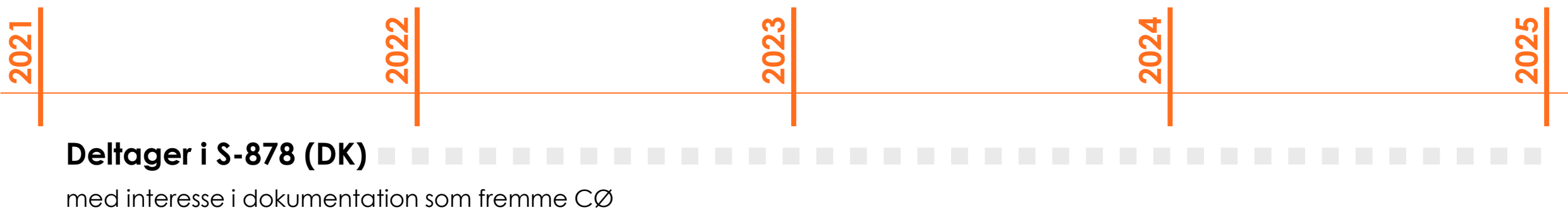
# Udvikling af nye CØB standards

DS & TI Webinar - 8. marts 2024

Martha Lewis  
Head of Materials, Henning Larsen



# Min rolle i SC-1 arbejde:



# Min rolle i SC-1 arbejde:



## Deltager i S-878 (DK)

med interesse i dokumentation som fremme CØ

## Deltager i WG 2 (EU)

identification af gaps i standardisering mht  
CØ af produkt og bygningsdokumentation

# Min rolle i SC-1 arbejde:



## Deltager i S-878 (DK)

med interesse i dokumentation som fremme CØ

## Deltager i WG 2 (EU)

identification af gaps i standardisering mht CØ af produkt og bygningsdokumentation

## Leader af TG-1 (EU)

skabe konsensus om / foreslå specifikke standarder mht CØ af produkt og bygningsdokumentation

# Working Group 2

## Gap analysis

Circular data, data storage and maintenance and product / building passports

CEN/TC 350/SC 1/WG 2 - Consultation report and findings V2 12/05/23

### 6. Circular data, data storage and maintenance and product/building passports

#### 6.1 Overview

In the construction sector, circular data documentation is considered to be an important means to achieving a more circular construction sector, to promote reuse at the material, product, element and project (a building or infrastructure) levels. Establishing an effective circular construction sector is a key to reducing waste, reducing the consumption of raw materials and reducing the negative environmental impact (carbon emissions and pollution). Promoting transparency in the form of digitalized product and built environment documentation, passports support more informed product selection in the planning stages as well as encourage reuse and potentially increase value at end of life in order to effectively close the loop. The objective for additional documentation on a product and on a project is to “support sustainable production, to enable the transition to a circular economy, to provide new business opportunities to economic actors, to support consumers in making sustainable choices and to allow authorities to verify compliance with legal obligations.” (The Circular Economy Action Plan’s Sustainable Product Initiative)

Development of a standardized product passport would ensure that knowledge of the content can be maintained and tracked, to facilitate maintenance, repair and renovation, as well as increasing the value of materials and products related to reuse and recycling. Establishing standards for product and building/infrastructure passports would support the goals of the Green Deal and in particular Circular Economy Action Plan’s Sustainable Product Initiative, the EU’s Digital Europe Programme and the EU Data strategy by improving product sustainability and digitalization, boosting material and energy efficiency, enabling new business models and circular value extraction based on data sharing. Several member states have integrated calls for circularity documentation in their national sustainability building strategies. Built environment data is border-less, therefore EU standards on data and data sharing are unavoidable.

As the ability to compare and exchange digital representations of objects in construction is essential for a circular construction world, product level passports should be comparable and interchangeable. If developers of passports do not make any agreements in this respect, there is a risk that this desired situation will not actually come about. (CB’23 Guide vers. 2, p.6)

Recording data in a structured and harmonized way enables the value and application possibilities of passports to be increased: standardization of data collection + standardization of 3rd party verification.

European standards are necessary for digitalized passports and would support the Construction Product Regulation’s commitment to the single market for construction products. To ensure a harmonized development of digital passports in the EU, it is essential to develop a standard defining format, scope, digitalization and data generation and access for digitalized product passports.

# WG2 Gap analysis

Circular data, data storage and maintenance and product / building passports

Gap No.	Preliminary GAP identified	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree	Don't know	Strongly agree + agree score	Net Score
3.1	Gap in EU Taxonomy: concept requirements exist / standards missing	2.45	5.6	1.1	2		0.85	8.05	6.05
3.2	In relation to EPD and to national and international EPD databases	2.7	4.45	0.8	1.25		2.8	7.15	5.9
3.3	Gap in standards for: a) Product level data – material passports, product data sheets, Construction product regulation revision/ declaration of performance, EPDs b) Building level data - Building passport, Digital Building Logbook	4.65	4.15	1.65	0.35		1.2	8.8	8.45
3.4	Standards linked to 1) Data quality, long-term reliability, comprehensiveness and exchange formats 2) the common standards, including semantic standards, data template standards and interoperability protocols 3) the data governance models, business models and strategies for running data spaces	2.55	5.15	0.95	2.7		0.65	7.7	5
3.5	Data ownership and sharing; data security and transparency	3	6.05	0.45	2.2		0.3	9.05	6.85

# WG2 Gap analysis

Circular data, data storage and maintenance and product / building passports

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3.5	Data ownership and sharing; data security and transparency	3	6.05	0.45	2.2		0.3	9.05	6.85

# Resultat af afstemninger om "Call for experts"

TG No	TG Name	Members
TG 1	Circularity related parts to a product, material and building passports/log-books	29
TG 2	Circularity assessment	35
TG 3	Pre-demolition and pre-redevelopment audits and evaluation	19
TG 4	Horizontal standard/Technical Report for re-use of construction, products, and materials	33
TG 5	Horizontal deliverables for design for circularity at all levels for construction	25

*Great support for the TGs*



# Task Group-1

## Hovedemner

**TG Leader: Martha Lewis,**  
**TG support: Charlotte Forsingdal**

**Meeting dates:   Nov. 28, 2023**  
**Feb. 6, 2024**  
**March 20, 2024**

### **1. Overlap mellem andre initiativer**

- EcoDesign Sustainable Product Regulation
  - Digital Product Passport (DPP)
  - CEN-CLC/JTC 24 (DPP data framework)
  - Byggevareforordning
  - Taksonomien
- 
- Mange private pas initiativer

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### 2. Hvad er behov – hvor mange niveauer?

- Råmaterialepas?
- Produktpas
- Produkt inventory
- Bygning og anlægspas

# Task Group-1

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- 2. Hvad er behov – hvor mange niveauer?**
  - Råmaterialepas?
  - Produktpas
  - Produkt inventory
  - Bygning og anlægspas
- 3. Store afhængighed på WG-1 definitioner**
- 4. Scope: "kun" CØ aspekter?**
- 5. Forhold til BIM**

# DPP indhold -fra CPR & ESPR

- Durability/service life
- Upgradeability
- Maintainability
- Repairability
- Reusability
- Recycleability
- Presence of chemical substances that inhibit reuse and recycling of materials
- Energy and resource efficiency
- Recycled content
- Carbon and environmental footprints



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# Om deltagelse i CEN/TC 135/WG2 x Structural Reuse

Karoline Fogh Gustafsson

Konsulent & Teamlead, Lendager Advising

# Introduktion til oplægsholder

- Karoline Fogh Gustafsson
  - Uddannelse: Designingeniør – Danmarks Tekniske Universitet, 2021
  - Lendager siden 2019
  - Teamlead & konsulent i Lendager Rådgivning
  - Strategi, rådgivning, udviklingsprojekter og undervisning
  - Structural Reuse siden 2021



**Karoline Fogh Gustafsson**  
*Teamlead & Konsulent*  
*Lendager Rådgivning*

# Structural Reuse

- Muliggøre genbrug af bærende elementer I beton stål og træ
- Dokumentation af elementers kvalitet og egenskaber gennem ikke destruktive test, indenfor en acceptable risiko
- Projektresultat skal samles i teknisk fælleseje: Tekniske specifikationer i form af DS/INF
- Opdagelsen af work item *Reuse of structural steel* i CEN/TC 135/WG2
  - Structural Reuse deltager i arbejdet for Europæisk indflydelse og trække på flere erfaringer

RAMBOLL

Lendager

DS  
DANSK STANDARDDTU Skylab  
LIST  
BYG

DTU

AARHUS  
BSSCENTER FOR SMÅ OG  
MELLEMSTORE VIRKSOMHEDER  
INSTITUT FOR VIRKSOMHEDSLEDELSE  
AARHUS UNIVERSITETGATE  
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# Deltagelse I CEN/TC 135/WG2 “Technical requirements for the execution of steel structures”

- Formål:
  - Teknisk specifikation *Reuse of structural steel*
  - Primært baseret på projekterfaringer
  - Proces for test af strukturelt stål mhp. genbrug
- En anden ekspertise end dyb tekniske viden indenfor strukturelt stål
  - Et procesorienteret perspektiv
  - Fokus på bæredygtighed



# Deltagelse I CEN/TC 135/WG2

- 3-4 årlige møder i arbejdsgruppen
- Projektleder der er ansvarlig for forfatningen af udkast til specifikationen
- Mødes online til gennemgang af udkast, kommentarer og diskussioner
- Lavere krav til en tekniske specifikation end en alm. standard
  - Skal ikke godkendes i andre komiteer og udvalg
  - Orientering og høring
  - Forventet snarlig udgivelse



# Indblik i den tekniske specifikation – Reuse of structural steel

- Processen
  - Vurdering af genbrugelighed:
    - Dataindsamling
    - Tilstandsvurdering
  - Kvalitetsvurdering
    - Geometri
    - Testprotokol (A, B, C eller D)



# Indblik i den tekniske specifikation – Reuse of structural steel

- Forskellige testprotokoller baseret på:
  - Viden om hvor stålet kommer fra
  - Er stålet produceret før eller efter 1970
  - Haves original dokumentation
- Testprotokollen foreskriver hvor mange destruktive prøver der skal tages

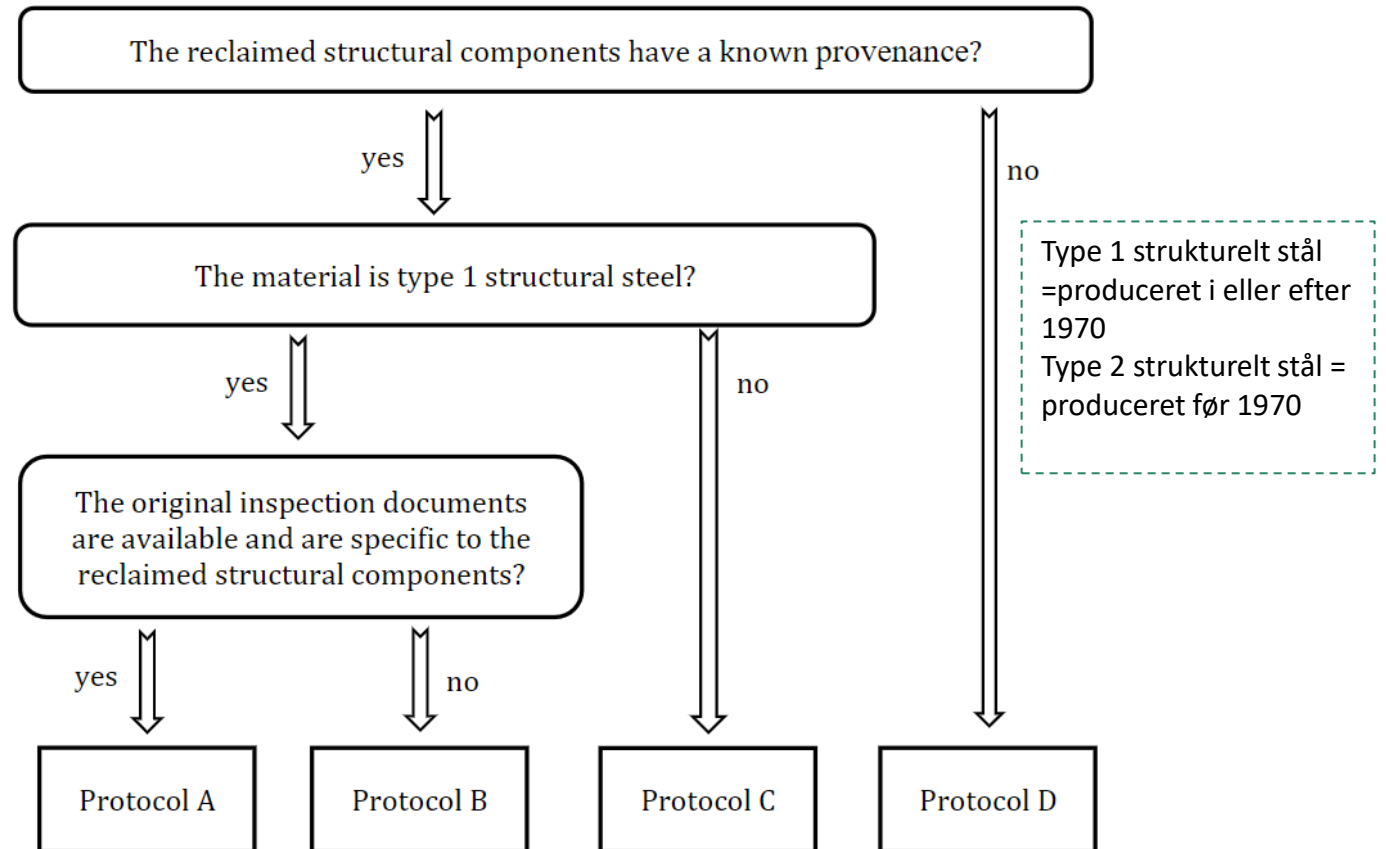


Figure 1 — Flowchart for the choice of testing protocol

# Anvendelse i Structural Reuse

- Format til udarbejdning af DS/INF for beton og træ
- Projektet ønsker at oversætte den tekniske specifikation for genbrug af bærende stål til dansk
- Testprotokollen skal afprøves på fuldskalatest i Structural Reuse



A blurred person is walking from left to right in the foreground of a modern building interior. In the background, a spiral staircase with a metal railing is visible, along with large windows and a glass door. The scene is dimly lit and has a teal color overlay.

Tak!



Videncenter for **Cirkulær Økonomi i Byggeriet**

# Få værktøjer til at arbejde med med CØ i byggeriet

Hvordan kan du bruge VCØB som værktøj i omstillingen til cirkularitet?

Lise Lyngfelt Molander Forretningschef for Bæredygtighed



# Status og vejen frem for VCØB og VCØB community



## Fra VHGB til VCØB

Videncenter for Cirkulær Økonomi i Byggeriet – VCØB (tidligere VHGB) – blev etableret i 2016 med en bevilling fra Grundejernes Investeringsfond, Realdania og Miljø- og Fødevareministeriet som en reaktion på et ønske i branchen om at styrke indsatsen for at formidle lovgivning på området til praksis.

Pr. 1. januar 2019 skiftede VHGB navn til VCØB som resultat af Regeringens Strategi for Cirkulær Økonomi, hvor der blev afsat 0,5 mio. kroner til drift af Videncenter for Cirkulær Økonomi i Byggeriet i både 2020 og 2021.

Derudover har VCØB opnået finansiering fra fondsmidler for perioden 1. januar 2020 til og med 31. december 2022

2023 har været fondet af RD og GI, men formål for at lande VCØB med brugerbetaling som indtægtskilde. Finansieringen stoppede oktober 2023

100 % medlemsbetalt

Forankret hos Teknologisk Institut

Afsæt bla i

- Roadmap for cirkulær økonomi i byggeriet
- Cirkulær Gap rapporten, inkl opdateringen

Samarbejdspartner til den cirkulære omstilling

Webinarer og konferencer

- Webinarer med fx samarbejdspartnere
- Konferencer/temadage

Nyhedsbreve

- Gratis
- Mere aktivitet på vores LinkedIn profil

Mulighed for at deltage i workshops

- CBF om Gap rapporten

## Overgang til VCØB 2.0 – Hvad har branchen brug for?

Teknologi – herunder AI, sensorik, droner, machine learning

Adfærd – på byggepladsen, kulturen, systemet rundt om

Spild på byggepladsen

Skal vi bygge al ting 4 gange – bygger forkert, med forkerte materialer

Fugt og skimmel – ved forkert byggeproces, opbevaring, levering

Selektiv nedrivning

Bygningsreglementet

...

## Ambitionen for det nye VCØB



Roadmap for Cirkulær Økonomi i Byggeriet skal konkretiseres og implementeres – en kombination af teknologi, regulering og adfærd



CØ gappet skal lukkes – vi skal reducere vores forbrug, så vi holder os indenfor de planetære grænser



Vi skal fortsætte med at opsamle og formidle viden om CØ

# VCØB den kommende tid

Nyhedsbrev – d. 06/03

Halvdags workshop for Nordisk Ministerråd i projektet Nordisk Netværk for Cirkulært Byggeri – d. 15/03

Webinar om cirkulære forretningsmodeller – d. 18/03

Region H CØ casesamling – vil blive løbende udbygget i år og igen i 2025/2026

## VCØB som værktøjskasse

Vidensbank

Show cases af alle de gode initiativer i branchen

Roadmap for cirkulær økonomi i byggeriet

- Konkretiseres og implementeres
- 28 indsatser

Erfaringsudveksling på tværs af branchen

Belyse konkrete problematikker og barrierer ved cirkulær omstilling



Videncenter for **Cirkulær Økonomi** i Byggeriet

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