

Dansk Betondag

Automatisering af betonbyggeri med 3D printet beton

22-09-2022

RAMBOLL

Bright ideas.
Sustainable change.



Philip Douglas



Rambøll, Urban Civil Structures



Odense



Rambøll (2021-)

M.Sc. Structural Engineering
Syddansk Universitet
(2019-2021)

COWI (2018-2019)

Rambøll (2017-2018)

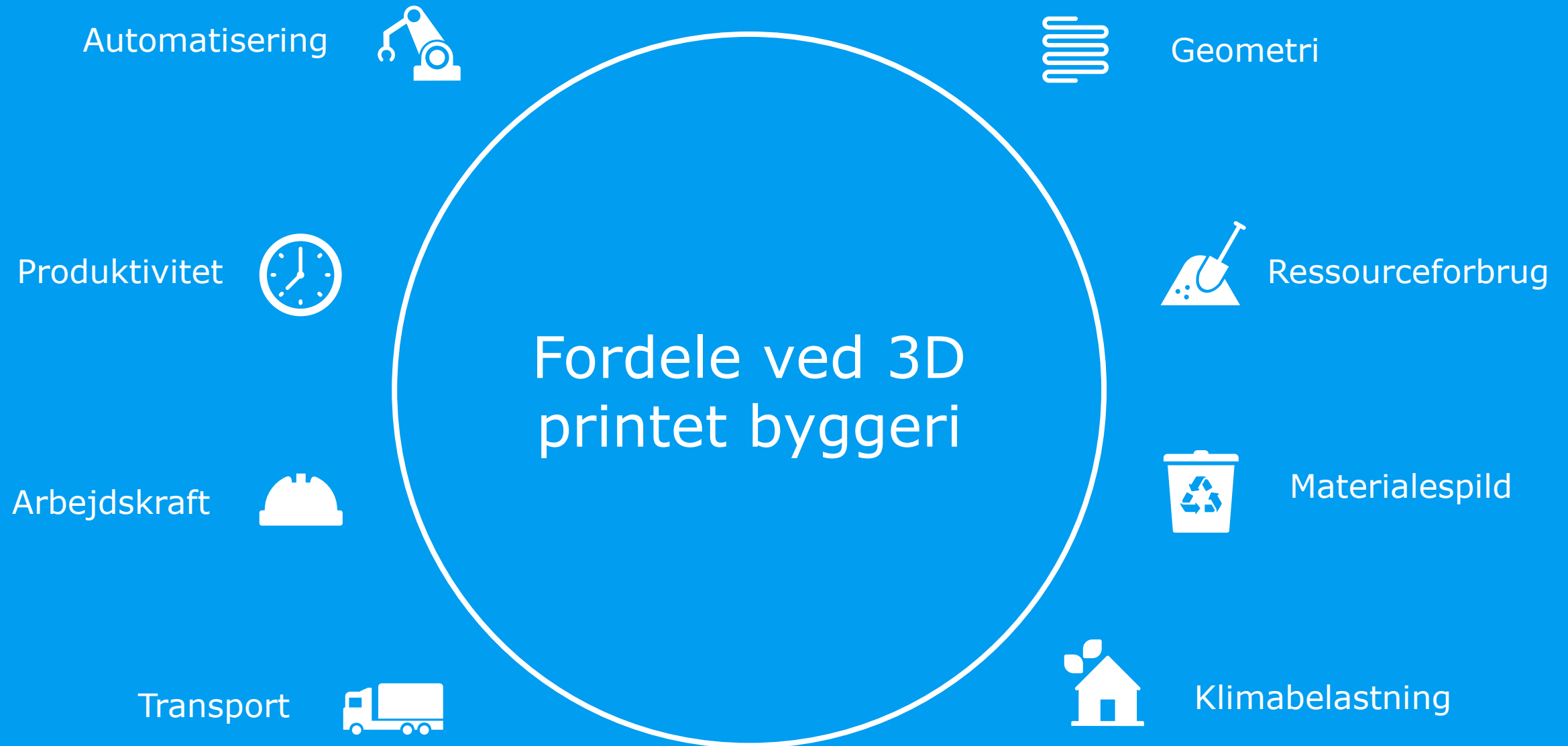
B.Sc. Civil engineering,
Syddansk Universitet
(2013-2017)



Automatisering af betonbyggeri med 3D printet beton

- Hvorfor er 3D betonprint interessant?
- Markedet for 3D betonprint
- 3D betonprint teknologi
- Standarder og godkendelse
- Aktuelle projekter i Rambøll

Hvorfor er 3D betonprint interessant?

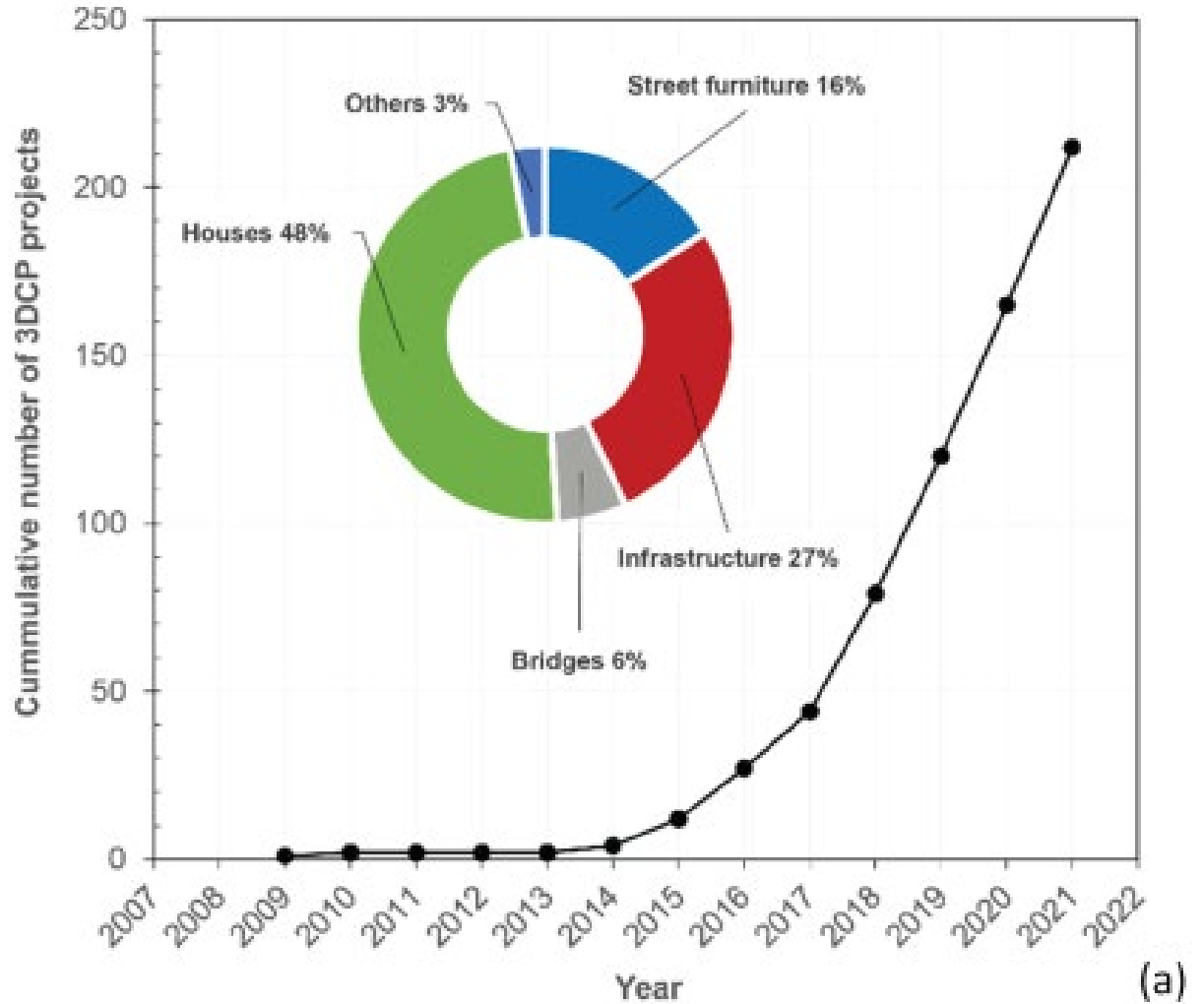
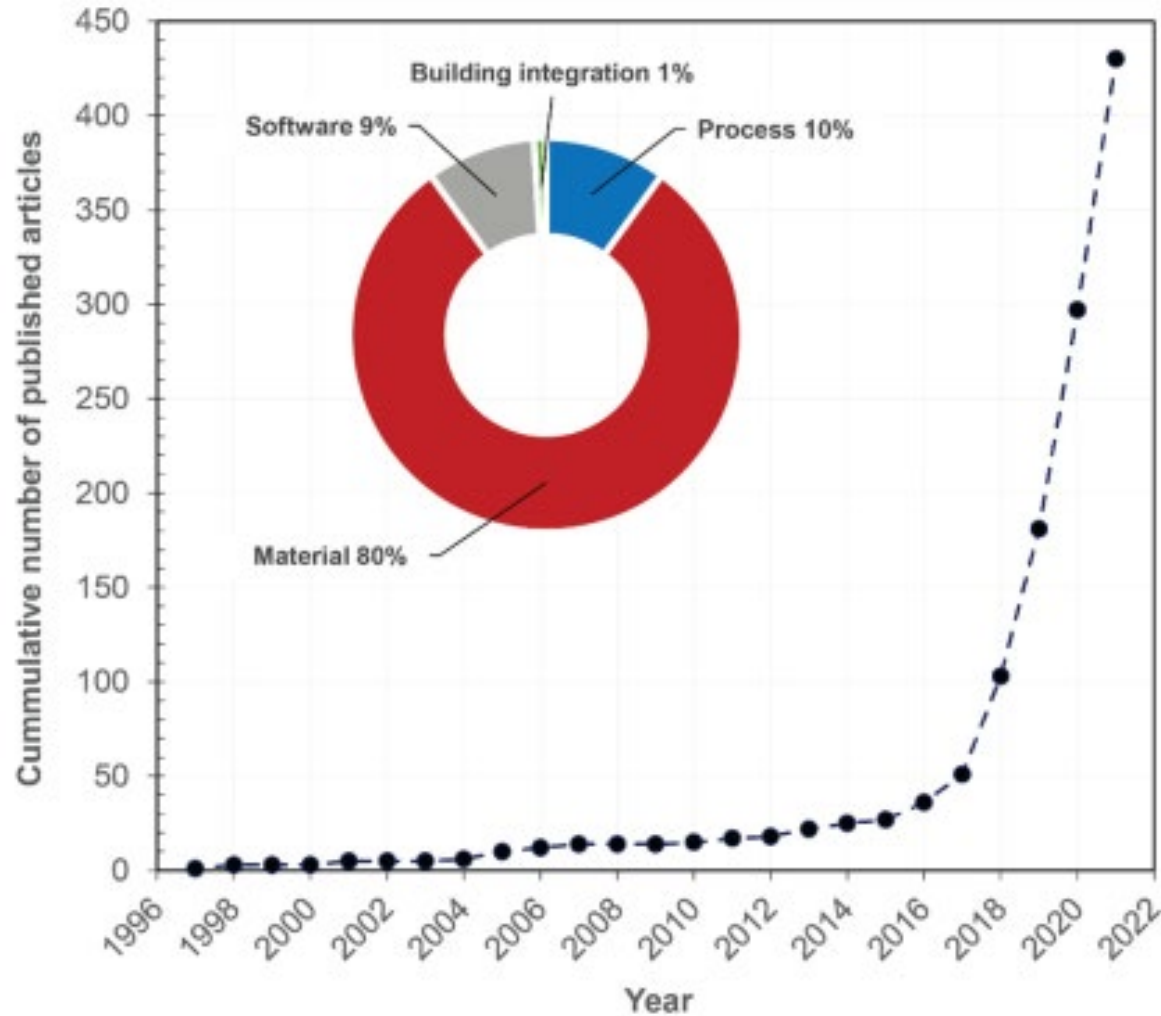


Markedet for 3D betonprint

3D betonprint er et globalt marked



Ekspontientiel udvikling



Kilde:

Technology readiness: A global snapshot of 3D concrete printing and the frontiers for development

Guowei Ma, Richard Buswell, Wilson Ricardo Leal da Silva, Li Wang, Jie Xu, Scott Z. Jones

Udvalgte aktører

Teknologileverandører



3DCP
GROUP



Materialeleverandører



Entreprenører og virksomheder



GE Renewable Energy



BESIX3D

Forskningsinstitutioner



State-of-the-art projekter



FUNDAMENTSELEMENTER, FINLAND



CYKEL OG GANGBRO, HOLLAND



3DCP GROUP, HOLSTEBRO



PERI / COBOD BOLIGBYGGERI, BECKUM



MINIMASS BJÆLKER, KONCEPT



TECLA CLAY HOUSE, ITALIEN

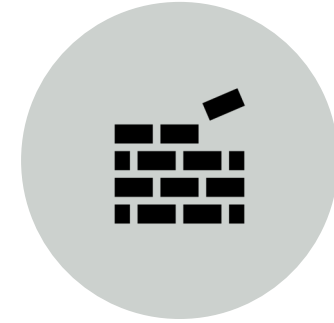
3D betonprint teknologi



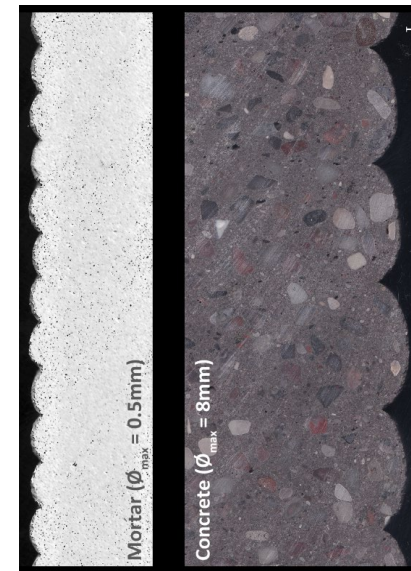
METODE



UDSTYR



MATERIALE





Standarder og godkendelse

Standards og godkendelse

ISO/ASTM DIS 52939
Additive Manufacturing for construction — Qualification principles — Structural and infrastructure elements

Eurocode 2: Betonkonstruktioner –
Del 1-1: Generelle regler samt
regler for bygningskonstruktioner

Eurocode 2: Design of concrete structures
Part 1-1: General rules and rules for buildings

Beton – Specifikation, egenskaber,
produktion og overensstemmelse

EN 206:2013+A2:2021
2021-03-24

State of Montana gives broad regulatory approval for 3DCP



American Concrete Institute
Always advancing

564 - 3-D Printing with Cementitious Materials

Committee Mission: Develop and report information on three-dimensional printing (3-D) printing, or additive manufacturing with inorganic cementitious materials.

Licensed to: Eigil Merkholt Hasling - Ramboll Danmark



3D Printing
Media Network

DANSK STANDARD
Danish Standards

DANSK STANDARD
Danish Standards Association

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Aktuelle projekter i Rambøll

Onshore hybridtårne til vindmøller



GE Renewable Energy



COBOD



Foto: Suzlon Energy Limited

Ramboll

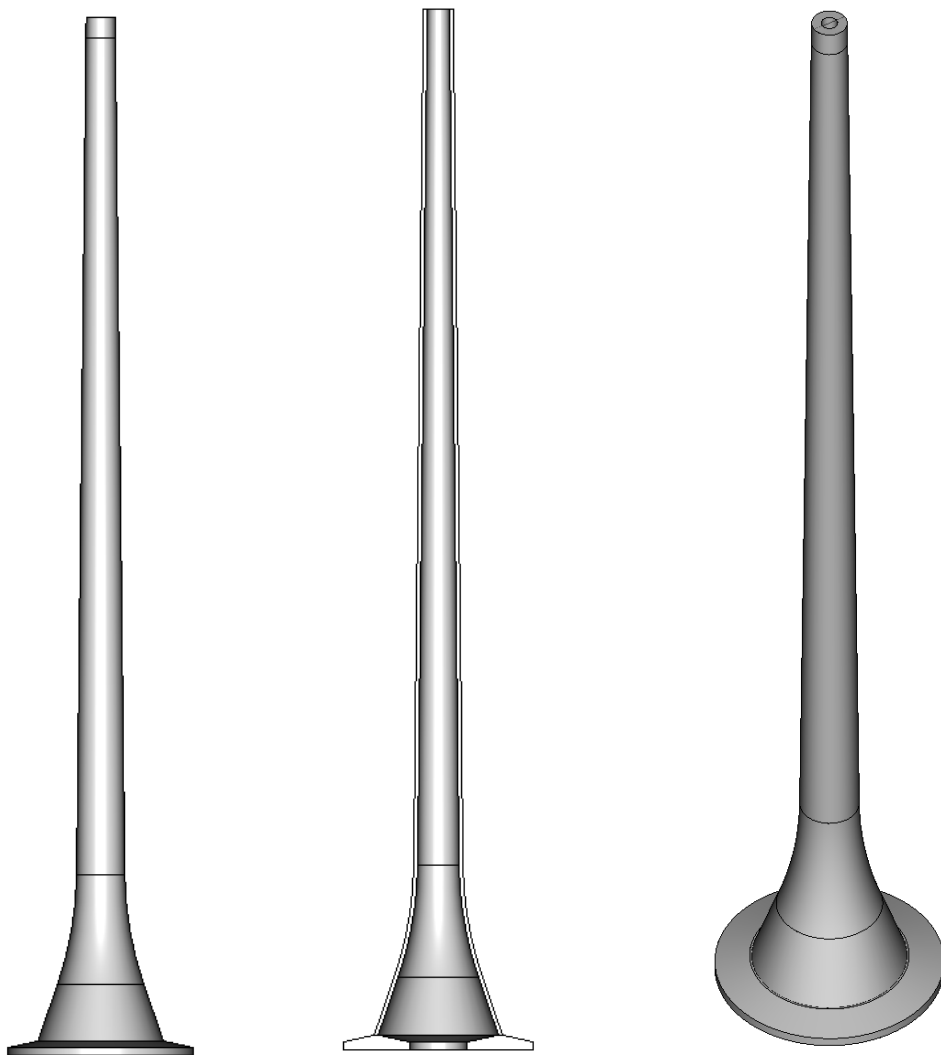


Foto: COBOD International



Foto: GE Renewable Energy

Høje vindmølletårne



Illustrationer: Rambøll

Foto: CJR Renewables



Foto: COBOD International

Kanalbyen, Fredericia

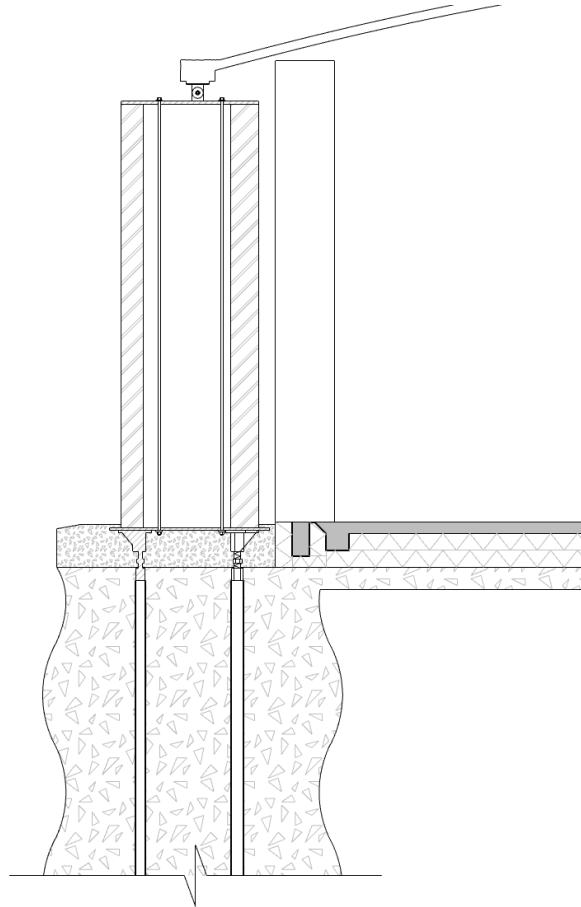
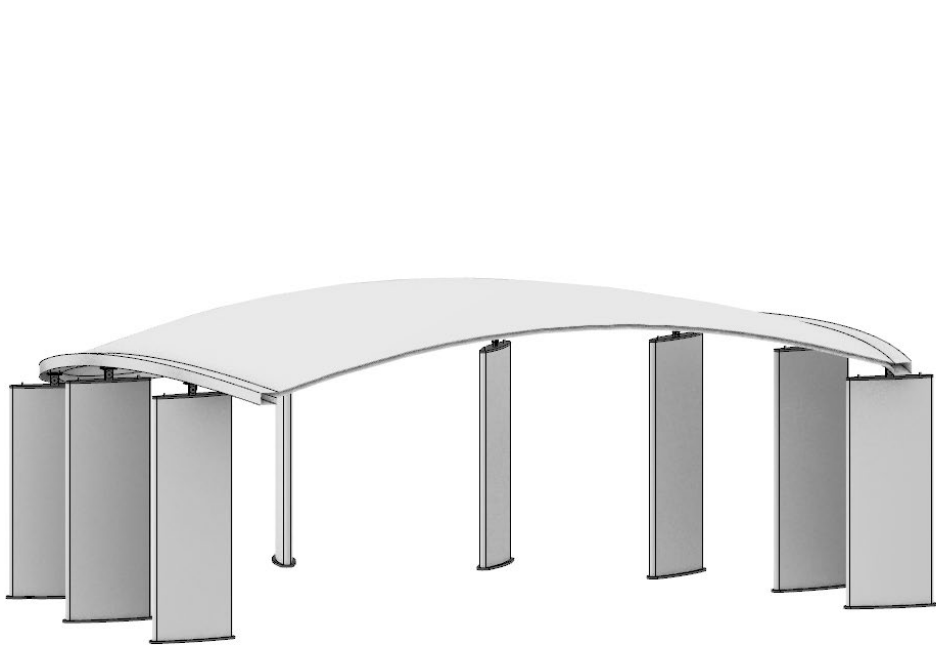


Foto og illustrationer: Rambøll





It's just the beginning

Tak

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