

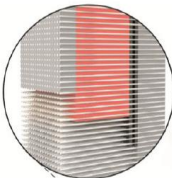


it's all about innovation

BRIGHTWALL - DAGSLYS IGENNEM BETONVÆGGE

Dansk Betondag 10. september 2015, Sørup Herregaard, Ringsted

Johannes Portielje Rauff Greisen, Arkitekt MAA, PhD, Konsulent, Teknologisk Institut


BrightWall Team
Brussels Meeting 19th of April 2013

BrightWall



CONFAC
funktional og funky beton

dupont
lightstone
enter the digital stone age

Polymer
Optics
Limited

UNStudio

THINK ENERGY
ECOCHOICE

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

CERIB
Concrete Expertise

DTU Fotonik
Department of Photonics & Optics

DANISH TECHNOLOGICAL INSTITUTE

Proposal full title:

Development of an innovative translucent concrete sandwich panel with dynamic control of light transmission

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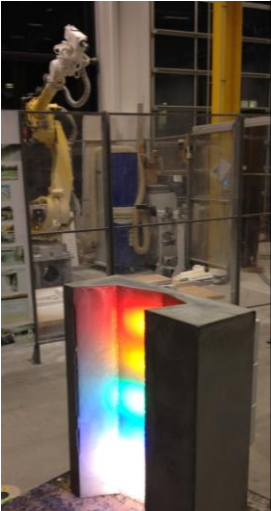
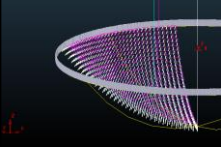
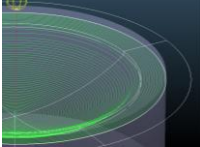


Indlejret teknologi



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Arkitektur

UNStudio



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Peek&Cloppenburg Store/Renzo Piano Building
Workshop/Cologne, Germany
photo: Michel Denance

Emporia/Wingardhs/Malmö, Sweden
photo: Tord-Rikard Soderstrom

Selfridges/Future Systems/Birmingham, UK
photo: G-Man, Wikipedia 2006

'Report for the end uses of BrightWall' - på stand og www.brightwallproject.eu

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Leiner Furniture Store/Zehner & Zehner/Grabenweg, Innsbruck
photo: Thilo Hardtlein



Printemps Store/Biecher Architectes/Strasbourg, France
photo: Luc Boegly



Kalverstraat/Amsterdam, The Netherlands
photo: Pink Paislee Blog

3.1.2 DESCRIPTION OF BUILDING TYPOLOGIES - COMMERCIAL

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Serpentine Gallery Pavilion 2002/Toyo Ito + Cecil Balmond+Arup/London, UK
photo: Sylvain Deleu



Tbilisi Public Service Hall/Fuksas/Tbilisi, Georgia
photo: Studio Fuksas



City of Arts and Sciences/Santiago Calatrava/Valencia, Spain
photo: Jacobo Gordon

3.1.2 DESCRIPTION OF BUILDING TYPOLOGIES - CULTURE/PUBLIC

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Motiv




Pixel Subtraction 				
Pixel Bundling 				
Original Image 				

Patterns Light Guides / Resolution

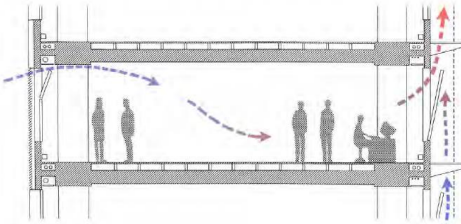
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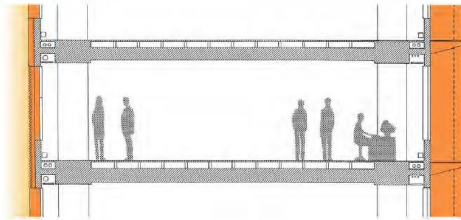
Motiv





querlüftung - großraum

cross ventilation - open plan



wärmepuffer

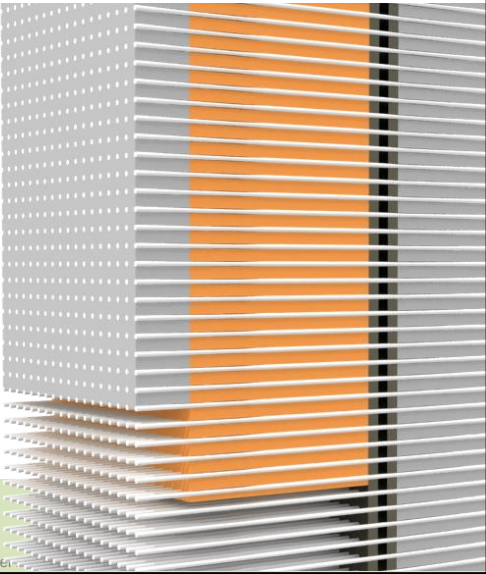
buffer zones

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Design koncept



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Dansk Betondag, 10. september

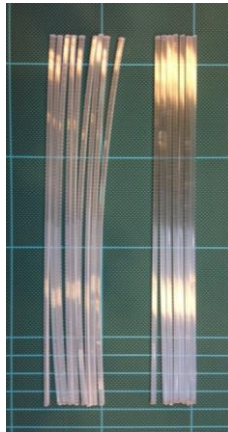


Lysledere

DTU Fotonik
Department of Photonics & Engineering

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Isolering

THINK ENERGY
ECOCHOICE^e

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Beton – Lab.

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Beton – Fab.

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Prototyper

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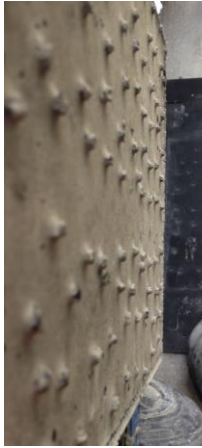
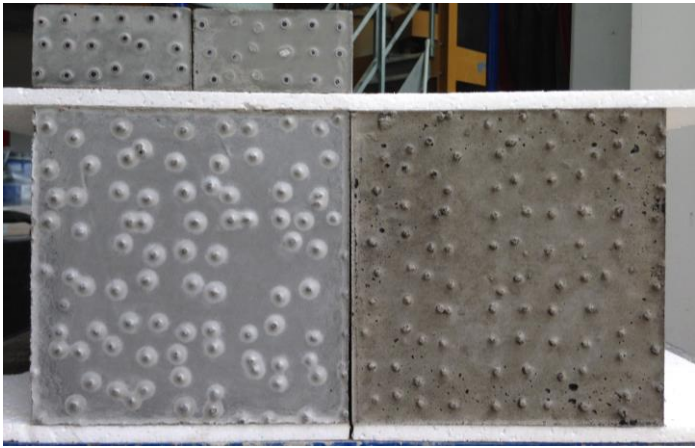
BrightWall, dagslys igennem betonvægge



Prototyper



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Samples max 20cm x 20cm

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Fuldskala



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Brand-emne, 70cm x 100cm

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Fuldskala



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Brand-emne, 70cm x 100cm

17




Fabrik



funktionel og funky beton



order the digital stone app

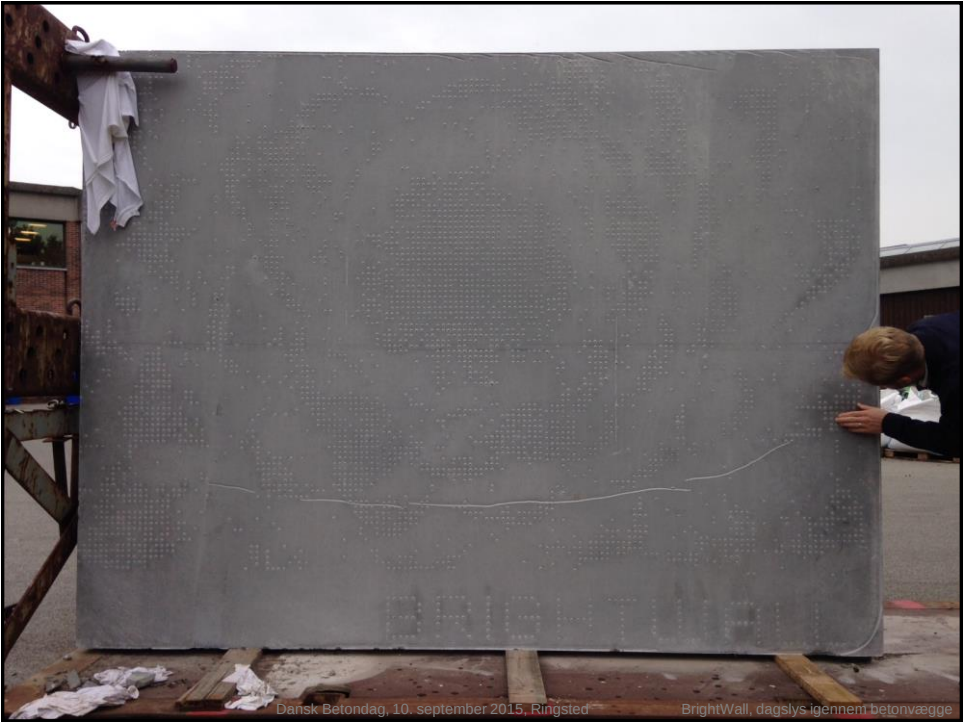
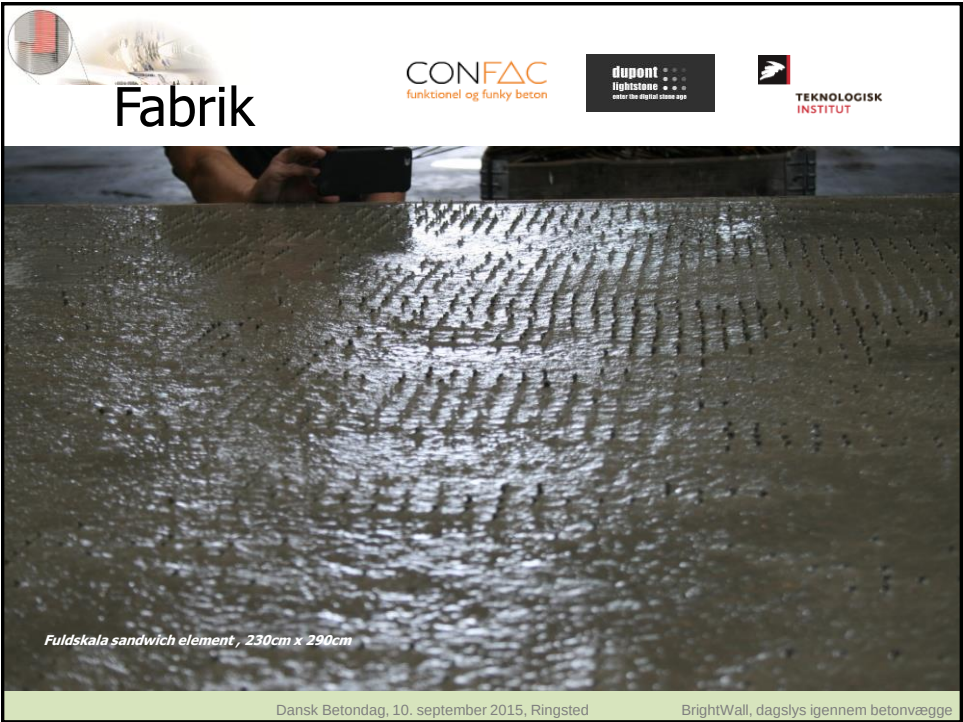


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Fuldskala sandwich element, 230cm x 290cm

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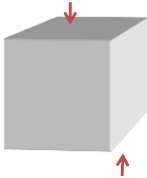


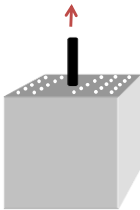
Test - Mekanisk




Hvad betyder lyslederne for betonens mekaniske egenskaber?

- Compressive strength: EN 12390-3
- Elastic modulus: EN 12390-13
- Flexural strength: EN 12390-5
- Bond between concrete and reinforcement: EN 10080





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BrightWall, dagslys igennem betonvægge



Test - Mekanisk




Ved 28 modenhedsdøgn – Pixel Pitch 10mm

- Trykstyrke: reduktion 10-15%
- Bøjningsstyrke: reduktion 30-35%



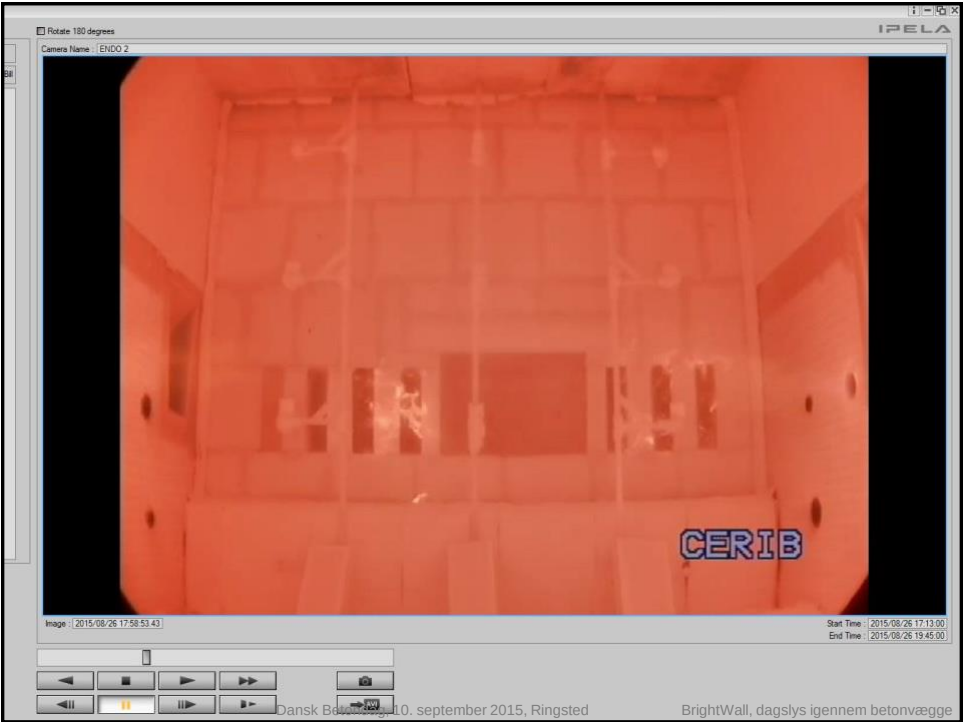


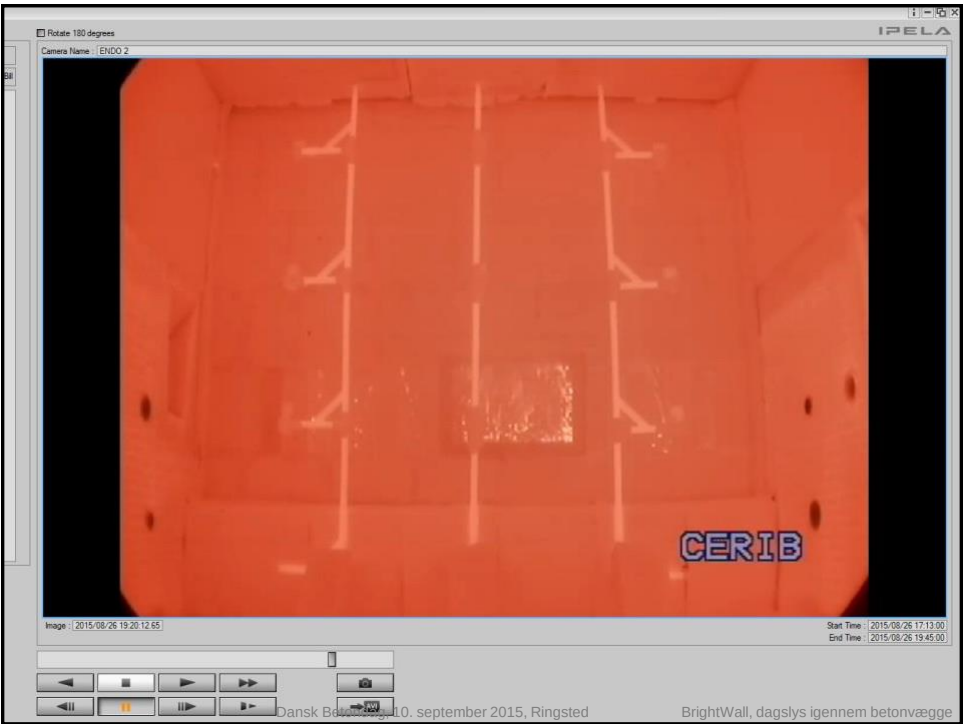

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Test - Robusthed

Frost-tø cyklusser er ved at blive testet.
Chlorid-migration er testet og viser migration i interface langs de optiske fibre.





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Test - Isoleringsevne

Lambdaværdier for Brightwalls tre hovedbestanddele er:

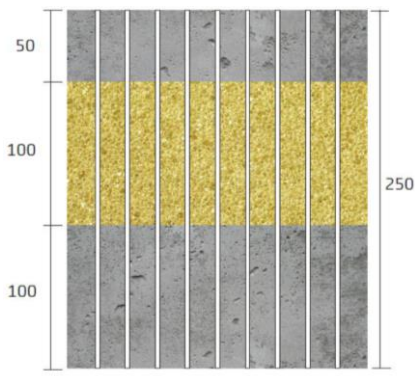
- Beton $\lambda = 2,000 \text{ W/mK}$
- Polycarbonat $\lambda = 0,200 \text{ W/mK}$
- PIR-isolering $\lambda = 0,025 \text{ W/mK}$

Teoretisk fastsættelse ved forskellige metoder og programmer, blandt andet HEAT2R

U-værdien for Brightwall

- $U = 0,240 \text{ W/m}^2\text{K}$ (blank)
- $U = 0,265 \text{ W/m}^2\text{K}$ (PP20)





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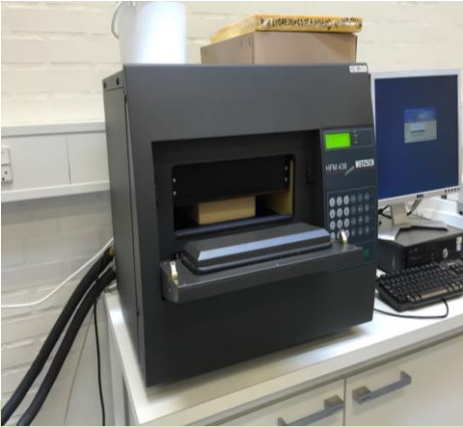
BrightWall, dagslys igennem betonvægge



Test - Isoleringsevne

Lambda-målinger i gang. Resultater og analyse afventes.



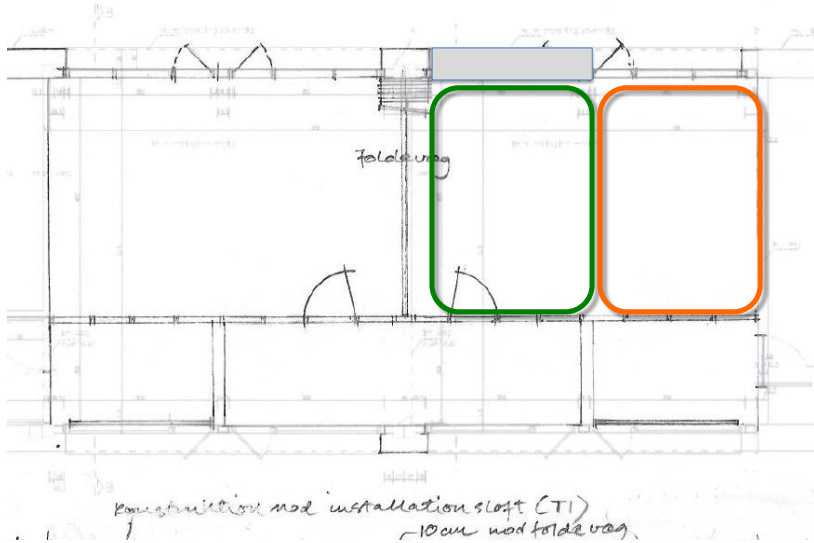
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BrightWall, dagslys igennem betonvægge



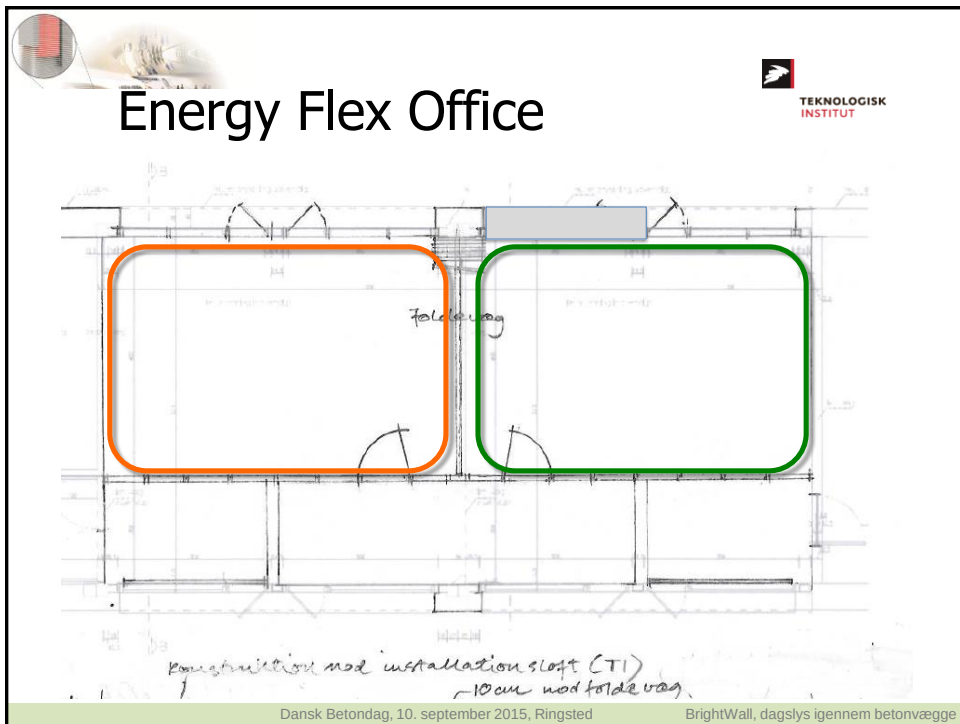
Energy Flex Office

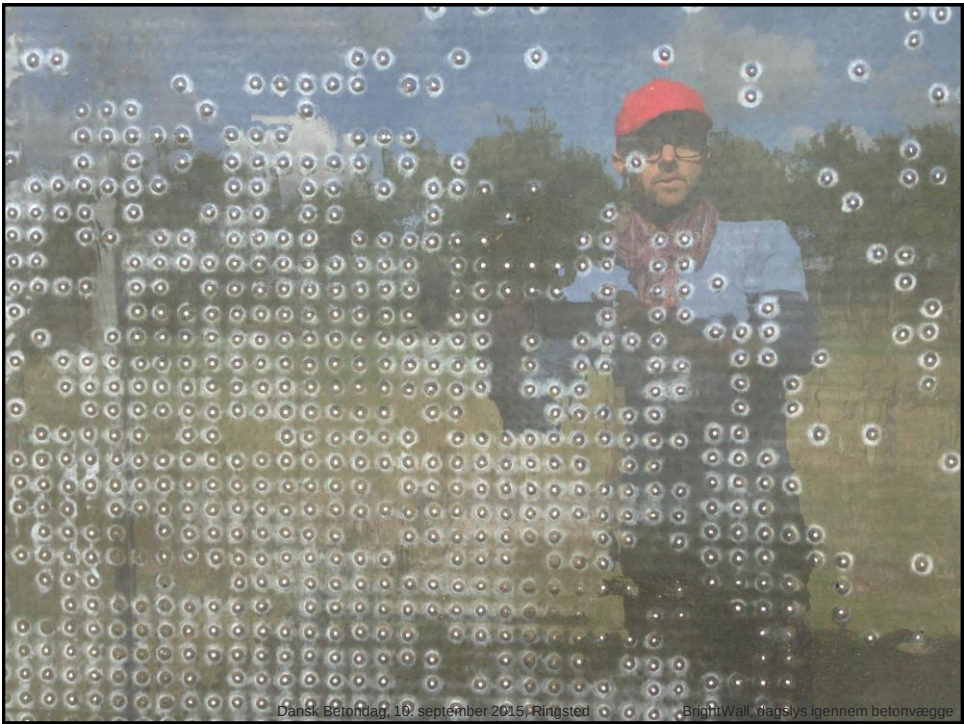
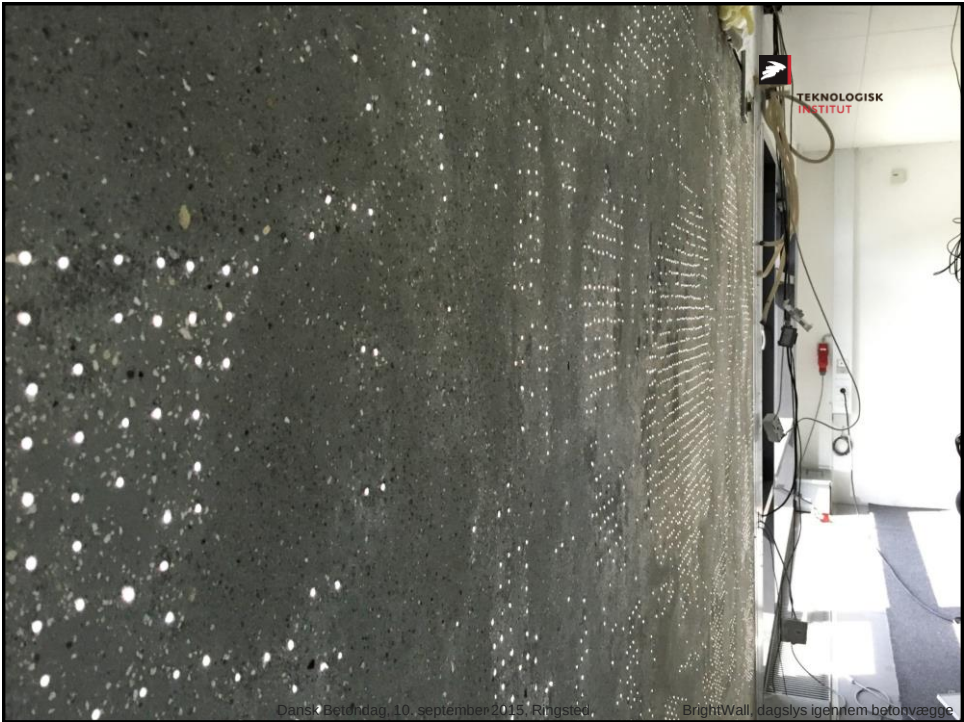


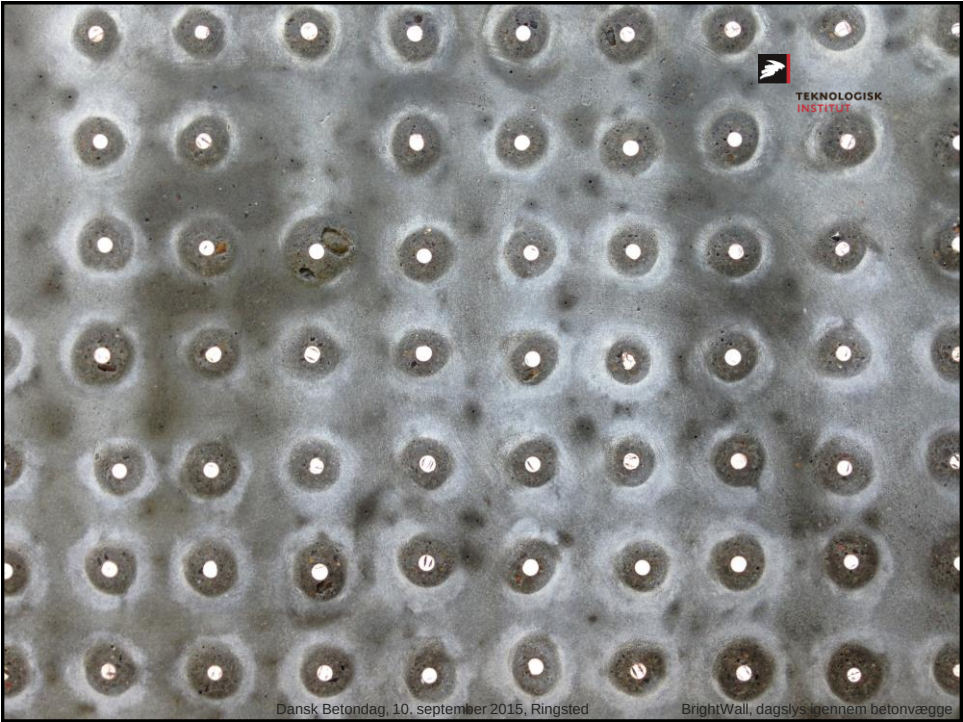


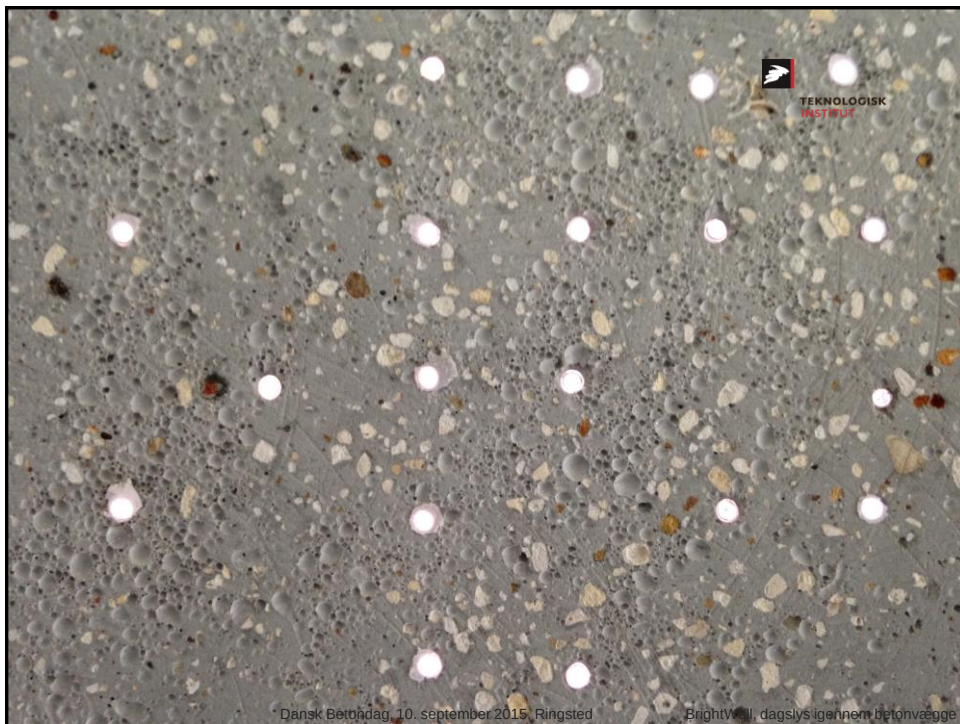
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Lysspil



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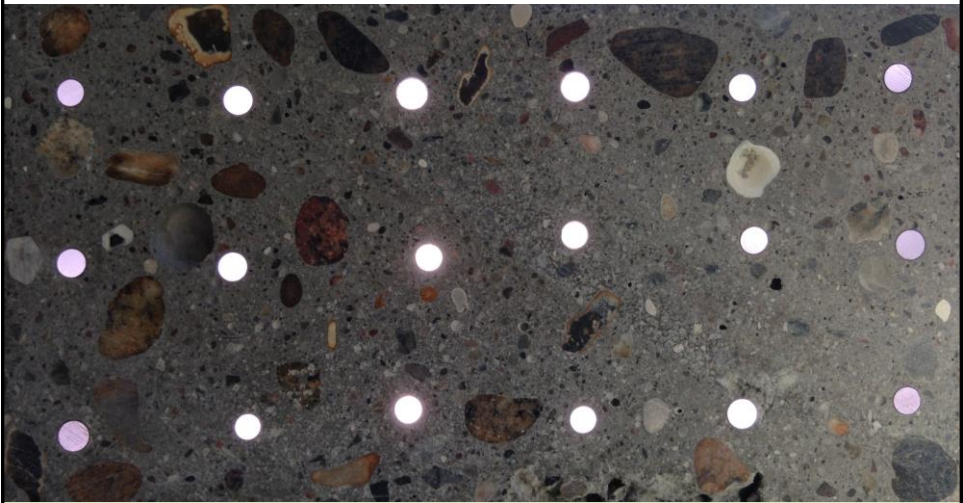
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Variation

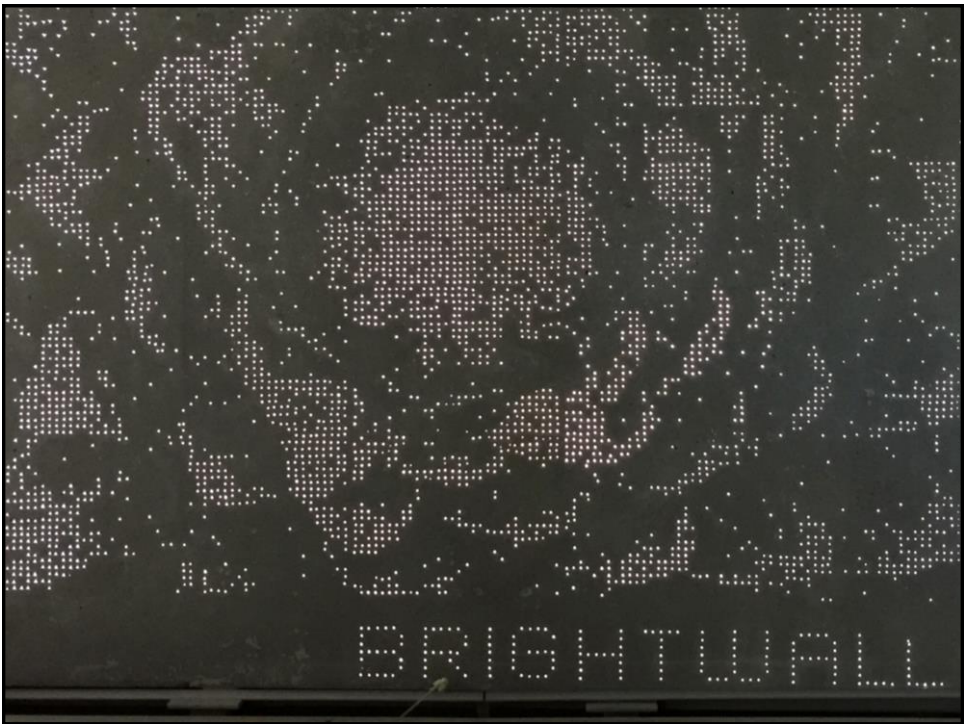


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TAK FOR OPMÆRKSOMHEDEN

Johannes Portielje Rauff Greisen, Arkitekt MAA, PhD jrg@teknologisk.dk +45 72202271