VÄLKOMMEN TILL STOCKHOLM OCH



16-17 oktober Münchenbryggeriet

Fire as a Designparameter to build firesafe and biobased buildings

Christian Fundby Schou Head of Advanced Product Development DBI – Danish Institute of Fire & Security Technology



Sveriges största mötesplats och konferens om byggnadsteknisktoch förebyggande brandskydd 16-17 oktober i Stockholm





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DBI 2

Country Overshoot Days 2024

When would Earth Overshoot Day land if the world's population lived like...



For a full list of countries, visit overshootday.org/country-overshoot-days.



OVERSHOOT Source: National Footprint and Biocapacity Accounts, 2023 Edition DAY data.footprintnetwork.org



Today's LCA emissions

Based on a 50-year reference period, the median footprint of Danish housing is 9,6kg CO₂eq/m² per year.

https://reductionroadmap.dk/reduction-roadmap

LCA emission target

Based on a 50-year reference period, the target footprint of Danish housing is 0,4kg CO₂eq/m² per year.

Lets use our knowledge on Fire

To solve the global challenges...











Accelerate Fire Safety Research within Biobased Buildings





8 Industrial Researchers in "Fire VS Wood"



DTU













Leo EVACUATION Ph.D Student with Lund

ION Lo vith Lund Ph.D S

Mansoure LCA and FIRE Ph.D Student with AAU



lan TIMBER PROPERTIES Postdoc with UoE



Ankit TIMBER/STEEL HYBRID Postdoc with Sheffield





Maja, KU WOOD FIRE DURABILITY Ph.D Student KU

Gouxiang, FACADE MODELLING Postdoc with Aalto

Aline FIRE & REUSE OF WOOD Ph.D Student DTU Ali FIRE DYNAMICS Ph.D Student with UoE

BioFireScale

A fire safety engineering tool for biobased insulation materials based on scaling

Providing tools to better understand the smoldering behavior of bio-based insulation materials

Examining how scaling influences the fire behavior of bio-based insulation materials

Jernholmen 12

RAND OG SIKRING

B



re Science Show

AUG. 28, 2024 166 – Bio–based insulation with Patrick Sudhoff





Bio-based insulation Patrick Sudhoff







Difficult to detect and extinguish



Can undergo a smoldering-to-flaming transition



Products

Buildings



Producers "one size fits all" mentality Classifications and standards "Pre-accepted" Fire testing worst case scenarios



Architects, Owners, Consultants, etc. Project specific solutions Unique applications - actual scenario Fire Safety evaluations (BK 1-4) Certified Fire Consultants

Fire technical product development





Reaction to fire Mini-SBI test



Resistance to fire Small furnace testing



Reduced scale facade





Documentation for compliance with functional requirements in BR18 (the Danish Building Regulations 2018), chapter 5



Wood:UpHigh

Performing and sharing 10 fire tested solutions for bio-based multi-storey building.







Wood:UpHigh

- Demonstration of biobased constructions
- 10 x Fire Resistance full scale test (REI)
- Inspire the industry to show what is possible
- Potential new pre-accepted solutions for biobased multi-storey buildings in DK.







Plantfiber batts

Paper granulate

Grass batts

woodfiber batts

















2 layer gypsum

1 layer gypsum





110 min REI90



71 min REI60



48 min REI30



113 min REI90



64 min El60



66 min REI60



72 min - kontakt 91 min



60 min REI60



81 min REI60



49 min





Contact DA

WOOD: UPHIGH RESULTS

These resistance to fire tests is available to use for inspiration and documentation. There will continuously be published new reports until the end of the project. There will not be published classifications reports, but only test reports. Test reports conducted through the Wood:UpHigh project will be redacted to leave product names, since the project cannot create competitive advantages.

Prøvningsrapportens resultater omhandler kun konstruktions brandmodstandsevne, f.eks. hvor lang tid Bæreevne (R), Integritet (E) og isoleringsevne (I) er overholdt. Den siger ikke noget om anvendelsesområde eller de indgående materialers reaktion på brandegenskaber. Temperaturmålinger mellem pladelag/indvendig i konstruktionen kan bruges til at vurdere brandbeskyttelsesevne af f.eks. isoleringen (F.eks. K1-10), dog kan målinger ikke sidestilles med klassifikation.

Anvendes rapporten til at opfylde et præaccepteret krav som f.eks. El60 – A2-s1,d0, bør man være opmærksom på at der er en afvigelse i forhold til reaktion på brand kravet samt beklædningskravet. Rapporten kan dog stadig anvendes i brandklasse 3 og 4 hvis der kan laves en eftervisning af denne afvigelse efter principperne i "Vejledning til kapitel 5 – Brand" - Kapitel 8 - Eftervisning.

Read more about Wood:UpHigh

TEST 0: EXTERIOR WALL WITH BLOWN-IN WOOD FIBER INSULATION





The construction of the test specimen: *Exposed side:* 1. 12 mm chipboard 2. 18 x 46 mm pine wood studs/spacers 3. 22 mm wood fibre board 4. 45 x 295 mm C24 dry graded

- construction timber with 295 mm wood fiber insulation blown in
- 5. 22 mm OSB3 board
- 6. 2 x 12.5 mm gypsum fibre boards



Download testing results online on <u>BrandogSikring.dk/uk</u>

The fire test was used in a specific project to show the performance in an outside scenario. Although the test was conducted prior to Wood:UpHigh, its results have been incorporated into the example catalogue.



Biofacades:UpHigh

Can passive constructions on the facade prevent firespread with biobased facadesystems?

No Sprinkler Systems – due to LCA

No Fire Retardants – due to durability

Only Passive solutions

More info on DBI homepage: Biofacade:UpHigh LINK



Support from:







Distances in the Façade system



Approx 2 min in test





Approx 2 min in test



	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10
L1: Distance from the chamber edge to the farthest protruding point at the chamber opening	205	160	366	401	360	302	302	302	326	
L2: Distance from the chamber edge to the façade wall surface	200	206	324	324	256	299	299	299	197	
L3: Distance from chamber edge to the deflector tip	375	365	639	654	540	587	587	587	489	







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THANK YOU!

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