

Danish Building and Property Agency

Danish Ministry of Climate, Energy and Building

Bygningsstyrelsen - BYGST
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Mærsk Building

The Agency's implementation of BIM in competitions.



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Vision:

The Agency ensures project results by focusing on cost management, time and quality.

We want to maintain all our buildings based on the 3D models the projects generate: to handle work space, energy, volumes and time.

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We started working with BIM in architectural competitions.

Contents:

- Overview of the Danish Building and Property Agency**
- IDM for competitions - IFC**
- History of our progress in competitions**
- Next steps**



Property Business:

Employees:	220
Office space:	1 mil. m ²
University space:	2 mil. m ²
Office space, leased	1.3 mil. m ²

Ongoing projects have a construction value of:

University:	9 bil.kr.
Office:	1.5 bil.kr.



SDU - Alsiön

Financial Law from 2010 - Laboratory grants of 6 billion dkr.

The government mandated the grants to be used between 2012 – 2016.

Half of the money will be used for renewal of laboratories and half of it for new constructions.



Panum laboratorier



Government requirements for using Information Communication Technology - ICT from 2011.

Types of Building Projects :

- Building projects after 1.3.2011
- New construction, rebuilding and renovations for the State Property Agency
- Construction financed >50% by the State
- All construction > 5 mil. kr.
- Architectural Competitions



CPSC. LTarkitekter

Building Agency's objectives.

What do these requirements mean to the Building Agency?

- By digitizing our building projects, we want to be more effective, reduce mistakes and thereby achieve more economical projects.
- We want to ensure that we can create and reuse valid data throughout the buildings' life cycles.



*Nørre Campus
- COBE*

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How does this effect our daily life?

- Over the last couple of years we have required competitive bids to be submitted in 3D models in competitions.

*The Building Agency IKT Requirements for Competitions:
Requirements for use of digital building models in 3D*

The client shall ensure that the competitive bids are submitted in 3D models.

1. The 3D models must illustrate and document the architectural and technical solutions, visualisation, simulations and analysis of the proposal.
2. The 3D model must be delivered in IFC
3. Client shall ensure that the received IFC proposals for architectural and technical solutions are used for judging the competition.



CPSC. LTarkitekteer

3D model in Contests – IDM for Proposals



Niels Bohr Science Park - 2010 - 45.000m²



Panum - 2010 - 35.000m²



Copenhagen Plant Science Center - 2011 - 6000m²



Ballerup Universitetscampus 2011 - 15.000m²

Ballerup Universitetscampus - 2011



Part of the competition text :

”A 3D digital building model must be submitted. The model should be submitted in its original format and in IFC format”

“The building model must be a BIM model containing the main objects at a low level of detailing – walls, doors, windows, roofs, foundations and slabs”

“The model will be used for area, energy and cost calculations and 3D visualisations of the building related to its surroundings”

“The property data of each room should be indicated by means of a room category in accordance with Danish Building and Property Agency standard”

“Quantity extractions for energy calculations must be defined as property in climate screen objects”

“Quantity drawn from the model must match the indicated quantity in the project.”

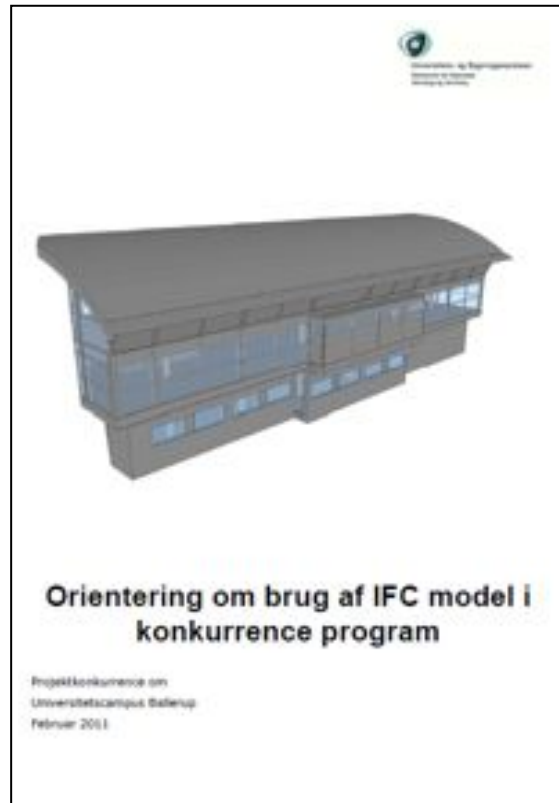


*Universitetscampus Ballerup
- Rubow*

IDM for 3D models in Competitions.

BIM - Check for data:

- Area,
- Energy
- Cost by area



1 Formål

Formålet med aflevering af IFC modellen er at den skal give forslagene for hvordan rumfunktionerne er placeret i bygningen. Desuden udarbejdes der opdeling af rum og arealer baseret på funktion samt statistik over fordeling af typene af rumfunktioner. IFC modellen skal således bruges til at lave forskellige udsnit af bygningen. I det følgende vil eksempler på udsnittene blive beskrevet.

BSPS bygningen er i dette dokument brugt som eksempel. Læs mere om BSPS bygningen her <http://www.bim.dk/2009/Mayo/Mayo0905050101>. Der er lagt UBS* rumkategorier på rummene i BSPS bygningen. Der er links til video eksempler på hvordan kategorier sættes på rummene i Appendix 1 (side 6). Detaljeringsniveauet på BSPS bygningen er dog højere end nødvendigt for at opfylde formålet.

For IFC filen afleveres skal den testes vha. IDM checker programmet som er tilgængeligt på <http://www.unisamhus.dk/idmchecker/indtast>.

Lad over rumfunktioner af 3D modellen blive brugt til Bx10 beregningen og økonomi beregningen.

2 Krav til IFC-filen

2.1 Generelle krav

- Skal være i IFC version 2x3 eller højere
- IFC-filen skal minimum indeholde én bygn
- En bygning i IFC-filen skal indeholde præc som angivet i forslaget

2.2 Krav til arealer og rum

Med "property" menes der et felt i et vilkårlig specifikke rum med IFCDefinableProperty

- Rumets nettoareal skal angives som prop
- Rumets kategori skal angives som prop
- Rumets kategori skal navngives præcist
- Rumets objektnummer skal angives som et nummer fysisk er placeret.
- Summen af rummenes nettoarealer per o passe med det i forslaget thematicke rum
- Alle nettoarealer skal oplyses som rum
- Etager, bygningsskåder eller lign. har e

4 Eksempler på farvelagte etage oversigter i 2D og 3D

2D og 3D rumoversigterne vil blive brugt til at vurdere hvordan funktionerne er fordelt over etagerne. Farvelagningen af rummene følger rumkategorierne.

Primære arealer	Sekundære arealer
<ul style="list-style-type: none"> Administrationsareal (F01-F04) Forskningsareal (F7-F12) Undervisningsareal (U1-U7) Studenterareal (S1-S4) Fællesareal (FA1-FA4) Stuearealer (S1-S6) 	<ul style="list-style-type: none"> Konstruktionsareal (K1-K2) Sekundært areal (S21-S26) Brumareal (B1-B4) Fordelingsareal (FO1-FO4)

Udsnit i 3D	Udsnit i 2D

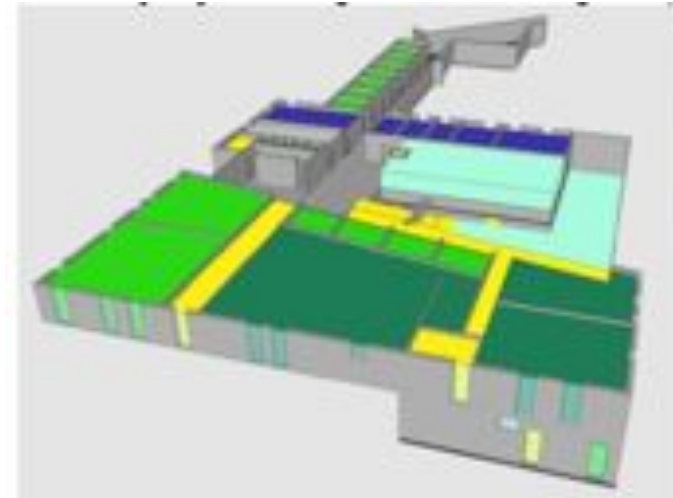
Analyses of digital submission

Output of BIM-check.

- DBK kodningen skal følge nedenstående tabel og sættes på property: 'DBKClassification'

Klimaskærms del	DBK kode
Kælderydervægge, beton	-205.D01
Facade uden glas/alu	-205.01
Tagdæk	-215.AD01
Terrændæk	-A210.01
Yderdøre	-205.03.EC01
Glas/Alufacader	-205.L01
Solafskærmning	-205.12

Property classification for climate screen



Distributions

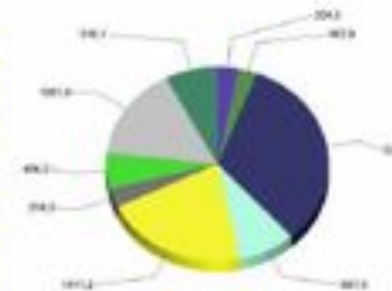
Energieresultater

	Transmissionstab (W/m²)	Energibehov for energi ramme 2015 (kWh/m²)
00177	Vest 1: 2,9 Øst: 3,2	Vest 1: 40,8 Øst: 40,9
01010	Vest 1: 2,8 Øst: 3,0	Vest 1: 38,4 Øst: 41,1
21505	Alle tre etager: 2,9	Alle tre etager: 33,0
23230	Vest 1: 2,0 Øst: 2,6	Vest 1: 39,8 Øst: 40,8 (50 brugstimer)
52325	Vest 1: 3,4 Øst: 3,1	Vest 1: 45,1 Øst: 44,2 (60 brugstimer)

Energy output

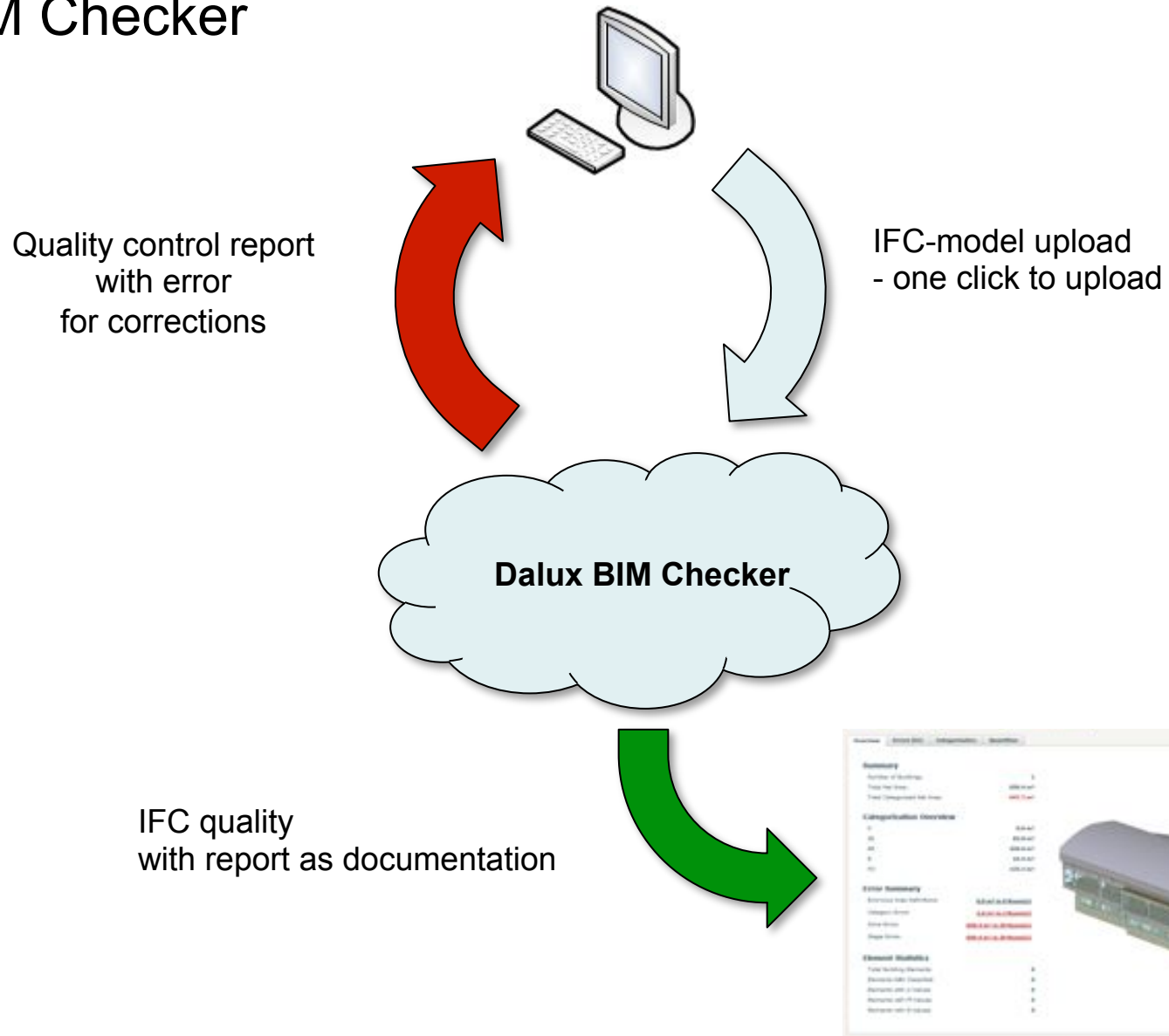
Main Categories for the entire building

Category	Net Area	Net Area to Room Programme	Difference	Description	Description (Dansk)
A	204,3 m²	0,0	0,0	Administration	Administrationsareal
B	187,6 m²	0,0	0,0	Secondary Room Area	Stuensareal
F	2088,1 m²	0,0	0,0	Research Area	Forskningsareal
Fa	947,0 m²	0,0	0,0	Common Area	Fællesareal
FD	1811,2 m²	0,0	0,0	Distribution Area	Fordistributionsareal
K	216,5 m²	0,0	0,0	Construction Area	Konstruktionsareal
S	404,2 m²	0,0	0,0	Student Area	Stuensareal
SB	1081,0 m²	0,0	0,0	Secondary Area	Stuensareal
U	818,1 m²	0,0	0,0	Teaching Area	Undervisningsareal
Sum	4794,2 m²	0,0 m²	0,0 m²		



Room category - requirements / actuality

BIM Checker





BIM – What have we learned ?

BIM in competitions
BIM in design process
BIM in construction process



- Clearer and more precise requirements
- Quality check
- Earlier project estimate
- Transparency

We made a useful IDM for competitions



Next steps - BIM

BIM in design process
BIM in construction process

- IDM in design process
- IDM in construction process

Thank you for your time

