From politics to openBIM requirements

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Our mission:

*Provide high quality specialist healthcare services to all who need it, when they need it; irrespective of age, origin, ethnicity, gender or financial standing.*

- **Norwegian secondary health services**
  - State owned public funded health trusts
  - Four regional health authorities controls 26 hospital trusts

- **South-Eastern Norway Regional Health Authority (Helse Sør-Øst HSØ):**
  - Providing specialist health services for 2.8 Mill. inhabitants (56% of the Norwegian population)
  - Budget: 8 Billion EUR
  - 10 Hospital trusts, plus 5 private non commercial hospitals
  - 70,000 employees
  - 2,6 Mill. m² floor area (excl. Private hospitals)
Hospital buildings – a strategic perspective

• Hospital buildings is one of several pieces in a health care system, where the overall objective is to get better health for the population.

• Hospital buildings is a strategic tool for the production of health services.

• The core business gives the premises for the construction and property management.
Our BIM vision

• Through BIM, achieving reduced cost and time spent on building projects, and at the same time getting better functional areas – with less faults.

• BIM is the concept and tool to reduce facility management and operations costs during the buildings lifespan.
HSØ overall openBIM strategy

- Adopted November 2011
- Give clear direction to the organization.
- Ensure proper focus from top-level management - throughout the organization.
- Focus on “business objectives” rather than technicalities.
- Give clear signals to the building industry, in relation to where South-Eastern Norway Regional Health Authority is moving.
HSØ overall openBIM strategy

• openBIM in all new projects
  – BIM is a strategic element in order to reach the prescribed quality, time and cost.
  – Contribute to a 10 % increase in efficiency within the property area (2010-2015).

• Our commitment to BIM shall be based on openBIM and guidelines from building SMART

• Contribute to the implementation of BIM in the building industry

URL – South-Eastern Norway Regional Health Authority BIM strategy:
HSØ overall openBIM strategy

• South-Eastern Norway Regional Health Authority will optimize the use of openBIM in the organization.
  – Training and education
  – Focus on the transition between building phases (customer/supplier relationship).
  – Focus on Lifecycle Costs (LCC - included health production cost), rather than investment cost.
  – Exploiting the potential of BIM requires ongoing assessment of the tools and methodologies that will contribute to this.

• Focus on industrialization in building projects
• Securing the property rights
openBIM strategy: Industrialization

- Standardization of floor lay-out
- Standardization of technical solutions
- Adapting structural design of the building to an industrialized concept
- Cost efficient building process
- Low Lifecycle Cost (LCC)
- Advanced building logistics

We consider BIM as an important element in industrialization of the building process.

Knowledge libraries
Evidence based design
Learning from the last project
openBIM strategy: Facility Management

Space planning and usage:
• 3D-BIM gives the possibility to plan the usage of the buildings better. Spaces can easily be connected to the functional hospital organization.
• It will be easier to check functional requirements with building attributes, when we are considering a change in the spaces.

Operations:
• Establish optimised Facility Management Systems, where the operating personnel (from the engineer to the plumber) have easy access to all necessary information in every operating situation.
openBIM Strategy:
Securing the property rights

• Securing all legal rights to the work done in all new BIM projects, in order to be able to reuse the functional and technical solutions in the organization and other regional health authorities.
openBIM Strategy:
Implementation of BIM-server

- BIM-server for both building projects and Facility Management
openBIM Strategy:  
Requirements to the models and storage formats

- All information in projects to be stored on open international formats (IFC – latest available version)

  **From 01.01.2014 the complete information produced by architects, consultants, contractors, etc., in their software applications, shall be exported to openBIM (IFC). All information shall be stored on the latest publicly available version of the openBIM IFC format. Similarly, software applications shall be able to import all the data stored in openBIM (IFC).**
openBIM strategy: Implementation

Our BIM Implementation strategy:
• Divided in eight parts with a list of actions in each part.
New Akershus University hospital


Ca. 117,000 m² new construction, 20,000 m² existing, 31,000 m² parking – 1 billion Euro

22 Operating theaters, 17 Diagnostic imaging labs, 615 Beds

Architect and HVAC complete 3D BIM model (Autodesk ADT / Architecture)
New Østfold Hospital - Kalnes
Projects at the hospital of Vestfold

- Nytt P-hus med helikopterplass
- Nybygg Skjerve - enhet 3
- Nybygg og ombygging NVDPS - Linde
- BIM og industrialisering
Facts – New Østfold Hospital
Facts – New Østfold Hospital

• Kalnes
  – 82 500 m² gross area
  – 3 256 user rooms
  – 551 technical rooms

• Costs (P50-February 2010)
  – Total project cost  5 090 MNOK incl. equipment and VAT
  – Contractor costs  2 450 MNOK exl. VAT.
Facts – New Østfold Hospital
Open BIM – New Østfold Hospital

Sentralt styringsdokument for Prosjekt nytt Østfoldsykehus

– Modellbasert prosjektering innebærer at BygningsInformasjonsModeller (BIM) brukes aktivt i prosjekteringsarbeidet for å oppnå bedre oppgaveforståelse, prosjektering, koordinering, kommunikasjon og kvalitetssikring i prosjektet og ikke bare til tegningsproduksjon.

– Det er lagt til grunn at modellbaserte verktøy tas i bruk og benyttes aktivt i alle faser av prosjektet, både når det gjelder ansattmedvirkning, prosjektering og dokument og tegningsproduksjon.
Sentralt styringsdokument for Prosjekt nytt Østfold sykehus

– Målsettingen er at en gjennom bruk av BIM effektiviserer arbeidsprosessene, både i prosjekterings-, gjennomførings- og driftsfasen. Videre at en også etablerer en bedre basis for overlevering av FDVU-data til driftsorganisasjonen. BIM skal benyttes som basis for gjennomgang og av klaring av ulike løsningsalternativ, slik at bygningsmessige og kostnadsmessige konsekvenser raskt kan analyseres. BIM skal også benyttes som basis for grensesnittsplanlegging og kontroll.
Open BIM – New Østfold Hospital

Sentralt styringsdokument for Prosjekt nytt Østfoldsykehus

– Det er lagt til grunn at de tre grunnelementene for åpen BIM (lagringsformat, terminologi og prosess) skal benyttes som grunnlag for effektiv digital informasjonsutveksling mellom byggherre, prosjekterende, entreprenør, driftsorganisasjon og andre aktører. All programvare som benyttes av prosjekteringsgruppen skal som prinsipp kunne kommunisere med åpen BIM-formatet IFC, og avvik fra dette skal aktivt begrunnes.

– Helse Sør-Øst har som målsetting at innføring av modellbasert prosjektering i prosjektet skal bidra til å øke kompetansen om BIM generelt, og gjøres på en slik måte at dette har overføringsverdi til andre prosjekter i det regionale helseforetaket.
Open BIM – New Østfold Hospital

Use of BIM shall contribute to achieve the project targets:

– Secure good information and basis for decisions
– Show positive and documented effects of the use of BIM and open BIM on costs, time, quality and Safety/health
– Facilitate for cost efficient facility management through the lifecycle of the building
– Carry though and document a showcase for other hospital projects
– Establish systematic procedures for the use of BIM and open BIM which will be of value / a learning case for other projects
Open BIM – New Østfold Hospital

Concretized:

– Better user process with 3D visualization
– Better quality design basis and documentation
– Energy efficient and sustainable solutions
– Better control with life cycle costs
– Industrialization of the construction
– Fewer errors in the construction process
– More efficient operation of the building

BIM strategy document
Adoption through challenging and facilitating
Adoption through challenging and facilitating
Consolidated model 12 13 parts from ARK, 16 30 from RIx

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<td>V311 Bunnledninger</td>
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<td>E400 Elektro</td>
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</tr>
</tbody>
</table>
Consolidated model 12 13 parts from ARK, 16 30 from RIx

IFC modell all disciplines:  ca 1.400 mb – 2.800 mb

Solibri model all disciplines:  ca. 80 mb – 300 mb

But not yet including the (sub)contractors models
From individual and fragmented, to shared and standardized data

Knowledge databases
- Best practice
- Specific knowledge

Briefing, requirements
- Functions
- Estimates, Budget
- Requirements

Renovation, rehabilitation
- Renovation
- Demolishing
- Rehabilitation

FM Operation
- Leasing, sale
- Maintenance
- Guarantees

Progress - time schedules
- Progress planning
- Logistics, 4D

CAD software
- Drawings, calculations
- Architect, engineer, ...

Building specifications
- NS 3420
- NS 3451
- Calculations, budget

Simulations
- Indoor climate
- Ventilation, HVAC
- LCCA
- Light and acoustics
- Heat loss
- Fire
- Environmental impact

Building application – E-submission
- Local authority
- Building permit

Tendering
- Product databases
- Price databases

Building Information Model (BIM)

IFC
Building Information Model (BIM)
Model maintenance through the construction phase

Design team:
Virtual construction site

Design (ARCH + STRUC)
Modelling (Design team)
Coordination (Design team + DB contractor + Main contractor)

Control

Model and harvest from model

Feedback from cross disciplinary model check

Basis for modeling

Main contractor 1
Main contractor 2
Main contractor 3

Input for detail design
Shop drawings

Basis for modeling

Basis for shop drawings

Working drawing
Basis for shop drawings
IFC, Solibri, Navisworks, FM

Client

SØ users

Design build contractor

Design build contractor 1
System design

Sub contractor t1
Sub contractor t2
Sub contractor t3

Sub contractor b1
Sub contractor b2
Sub contractor b3

Basis system design
Shop drawings
Vizualizing of time schedules