

VDC– a project example

Teknostallen Trondheim
Pre-project

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Omsetning i SEK

54 mrd

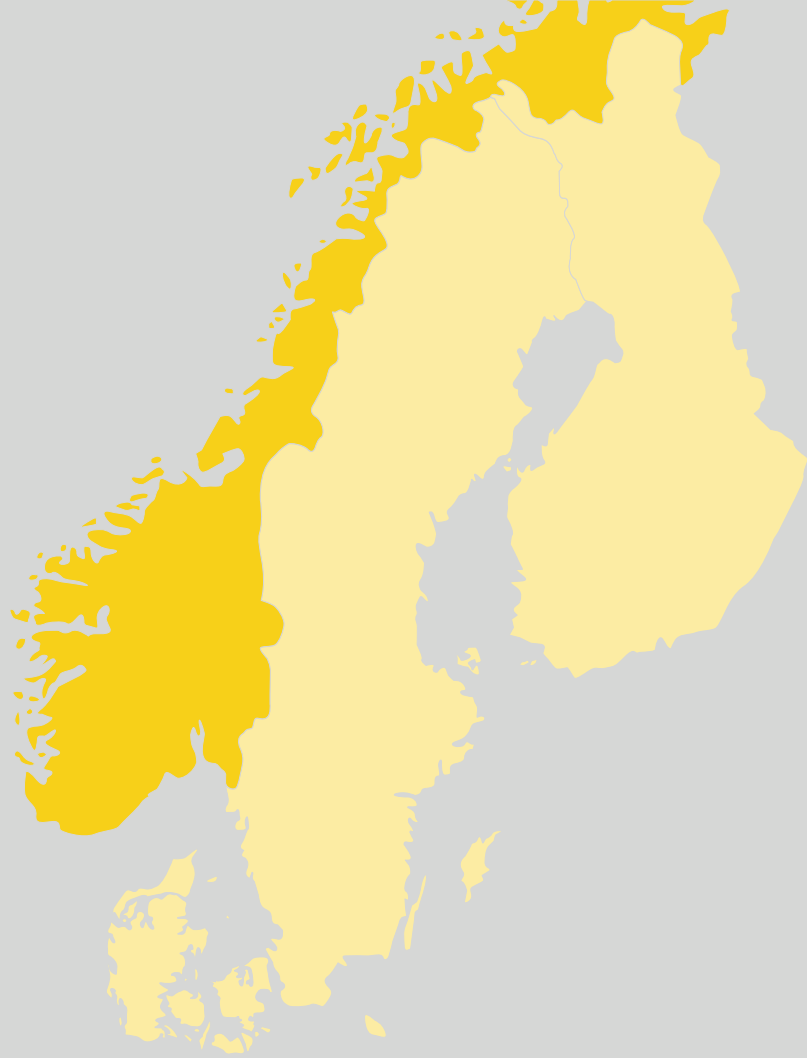
Ansatte

14500



NCC is one of the Nordic region's largest contractors and property developers. The company carries out both small and large and complex projects.

NCC works throughout the value chain, and creates good environments for work, housing and communication.



Omsetning i NOK

6,8 mrd

Ansatte

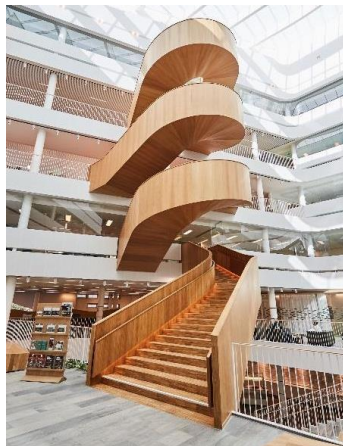
1 950

Ett NCC - five specialized business areas

Bygg og anlegg



NCC Infrastructure



NCC Building
Sweden



NCC Building
Nordics

Industri



NCC Industry

Utvikling



NCC Property
Development

Teknostallen, office-building/shops/underground parking garage

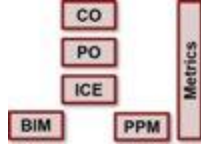
Key figures:

- New building - 47.250m², preservation of protected facade
- Approx 1.500 office spaces
- Garage for 120 cars and 700 bicycles
- Atrium has a tropical climate
- Running track on the roof
- Inauguration in 2025
- Construction start in 2023, completion 2025
- With funding from KLP Eiendom finalizes the development of Teknobyen in Trondheim





VDC in Teknostallen



Customer Objective - CO:
Create a landmark which is attractive for the rental market

Client Objectives

Project Objectives

Project Objective - PO:
Design a buildable “scope” before 1.12.2021 with a cost < 17 000 NOK/m2

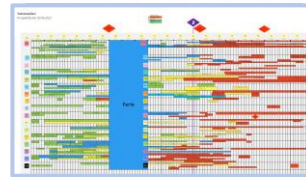
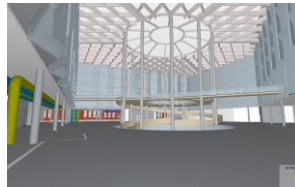
ICE- Integrated Concurrent Engineering:

- Co-located with weekly ICE-sessions
- Every decision-maker easily accessible
- Well-planned and executed ICE - sessions



BIM and digital interaction:

- BIM actively used in every meeting
- BIM from sub-contractors updated and coordinated weekly
- Area and cost based on data from BIM



PPM - Project Production Management

- Design-plan checked and adjusted weekly
- Interdisciplinary tasklist checked weekly
- Weekly review of the model and coordination ahead of ICE-sessions

Client Objective - CO

To create a landmark which is attractive for the rental market

- Environment:
 - Bream Excellent, WELL Platinum
 - Re-use of facade, materials and equipment
- Quality
 - Tropical garden, 2 000m2, in the atrium
 - Running track on top of the roof
 - Urban agriculture and beekeeping on top of the roof
- Time
 - First construction stage completed in july 2023



Project Objective - PO

Every CO buildable before 1.12.2021 with a cost < 17 000 NOK/m²

- Environment:
 - 27% reduction of the CO₂-footprint in the pre-project, with potential for further reduction
- Time:
 - Pre-project finalized 01.12.2021
- Quality:
 - Every CO buildable
- Cost:
 - Reduced by 10% from sketch project



Project culture



- Kick-off with common goal
- Kick-off created the culture and made it clear that we will be "in the same boat"
- Important that every member takes part in the kick-off
- Joint statement
- The statement will be used in a regular manner during the project as a checklist.

Risiko / Kvalitet:

- ✓ Høy bærekraftig kvalitet på løsninger og produkter som varer lenge og er god å drifte
- ✓ Eierskap til felles mål i prosjektet
- ✓ Skape landemerke

Christine Gjermo
THOMAS NERSEN
SPRINN IREN HUSBY

Samarbeid / Kommunikasjon:

- ✓ Teknostallen AS
- ✓ Åpenhet / Høy takhøyde
- ✓ Felles målsetting

Lasse Antonsen
Vlf Hovgaard
KIM BRUN LAURITZEN

Økonomi / Målpris:

- ✓ Fokus på hele livsløpet, bærekraft
- ✓ Felles ansvar økonomi
- ✓ Konkurransedyktig

Are Breime
Christoffer Brøtke
GJERMUND JOHNSSEN
Elizabeth Wornes
Morten Arnegård
LASSE VOLDEN
MAGNUS I. KAPSTAD

Tid / Fremdrift:

- ✓ Åpenhet om egne behov og respekt for andres
- ✓ Omforente planer, fornuftig PNS
- ✓ Løpende kommunikasjon på en felles kommunikasjonsplattform der vi har tilgang til felles underlag

Stig Trondsen
Trond-Espen Lorentzen
Susanne Almlås
Bente Johannessen
Joar Spencer Gjerdnes
FRØDE PØRSNES
Erik Langorge
Per Steig Selbakk
Mouru Nilsson Ervik
Jan Arne Østby
Hilde Kristine Brann

Beslutninger:

- ✓ Riktig beslutning til riktig tid
- ✓ Aktiv og tydelig byggherre
- ✓ Beslutningsplan

Howard Sande
Thomas Giertzen
Andreas Blix Olmfon
Jan Martin Lervåg

ICE

ICE- Integrated Concurrent Engineering:

- Co-location with weekly ICE-sessions
- Every decisionmaker easily accessible
- Well planned and executed ICE-sessions
- **Good preparations=
short and effective meetings=
quick decisions that last**

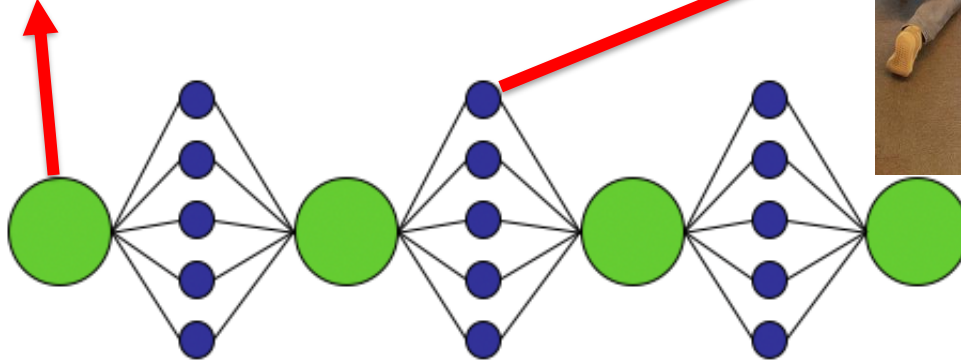


ICE-planning and execution

ICE-meeting



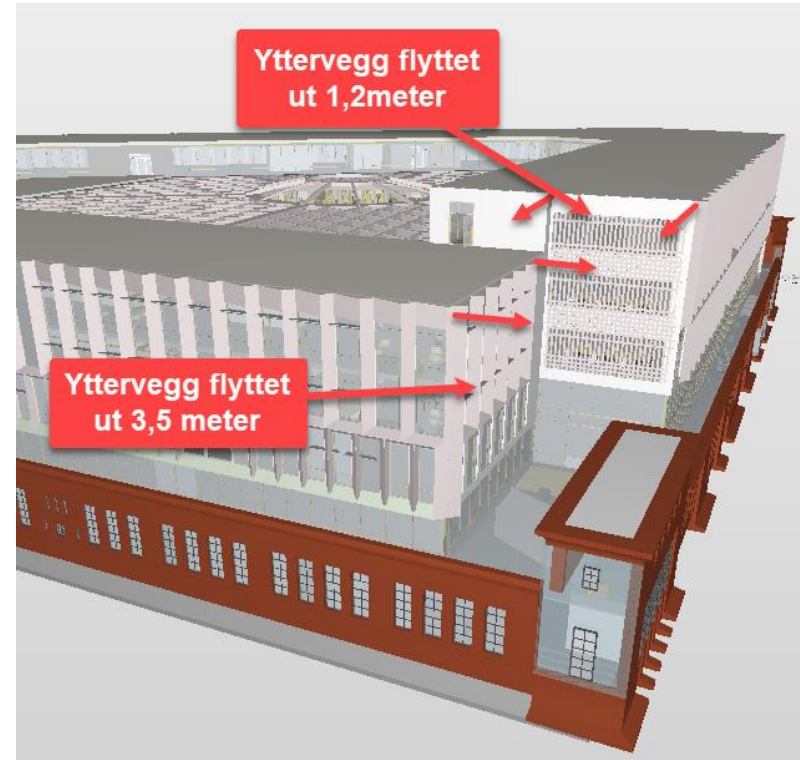
Breakout-sessions



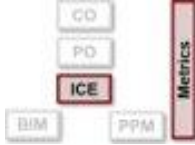
ICE-result

Optimization of the area

- Moved and optimized function and size of rooms
- Use of «empty space» as rentable area
- Moved the outer wall
- Low cost per m²
- BIM-model is an important tool here
- Expanded the area of the plot with 1050m² in total



The effect of collocation and ICE



«Significant reduction of email and other forms of correspondence due to the co-location. Informal and ongoing clarifications can be done in the «hallway». Hands-on control of the project development/costs.»

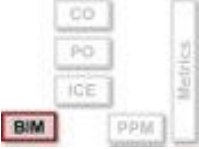
Trond Espen Lorentsen, NCC, Head of project

«Interdisciplinarity and professional talks, building design **during the same day** is an advantage. «Build before building». Easier to discuss challenges when we know each other.»

Jens K Johannessen, PIR2 Arkitekter AS

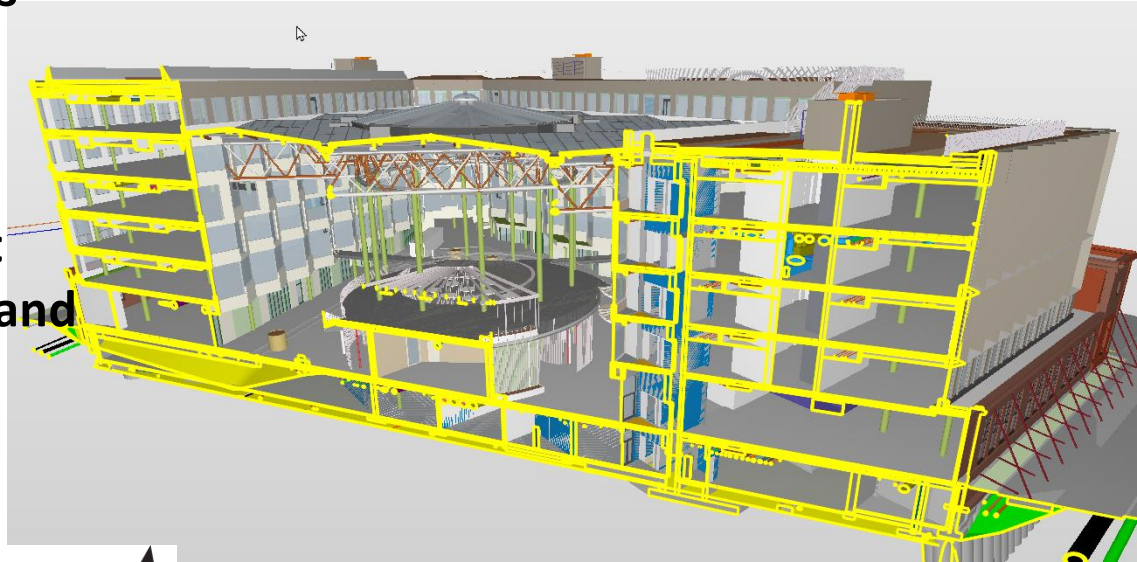


BIM

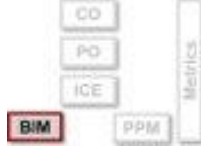


- Active use of BIM in every meeting
- Models from every disiplin updated and coordinated weekly – 23 models

BIM is one of the most important tools to maintain control of area and cost



BIM+ → VIA



Digital tools in the project

- V (I) (A) Revit
- V (I) ArchiCAD
- V (I) A BIM-collab
- V (I) A Kvist
- V (I) MIRO
- **V I A** Solibri
- V(I) Tekla
- V (I) Dalux

Automatisering

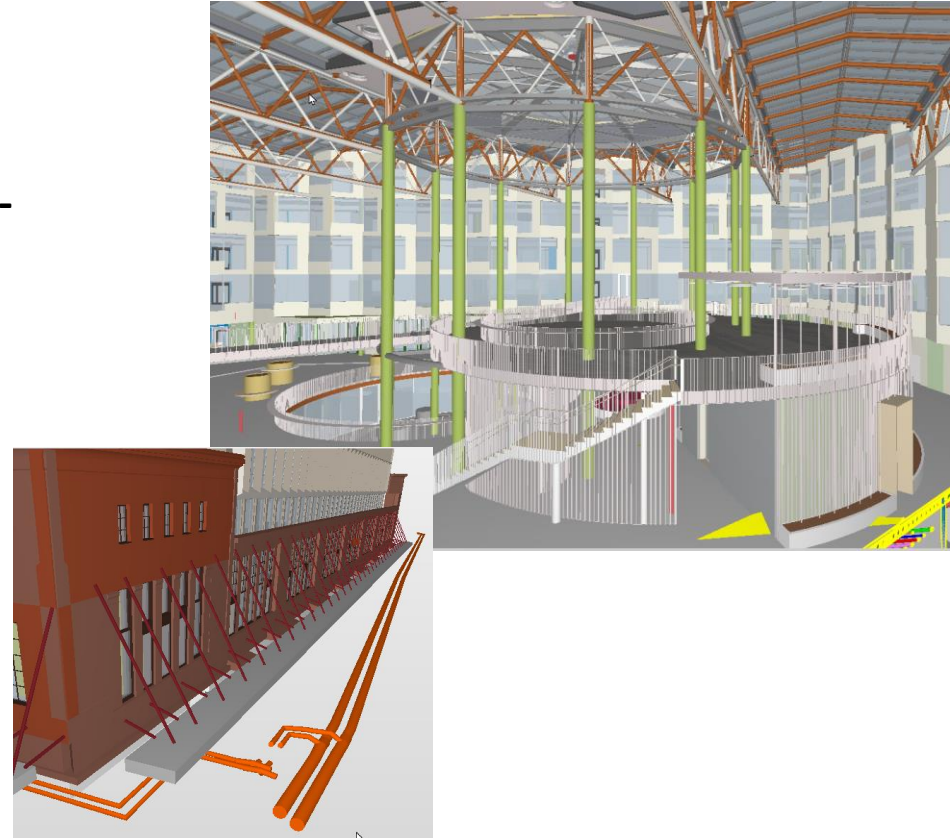
- Glasstaket
 - Arkitektur
 - Bæring
 - Klima
 - Dagslys
 - Akustikk
 - Vedlikehold



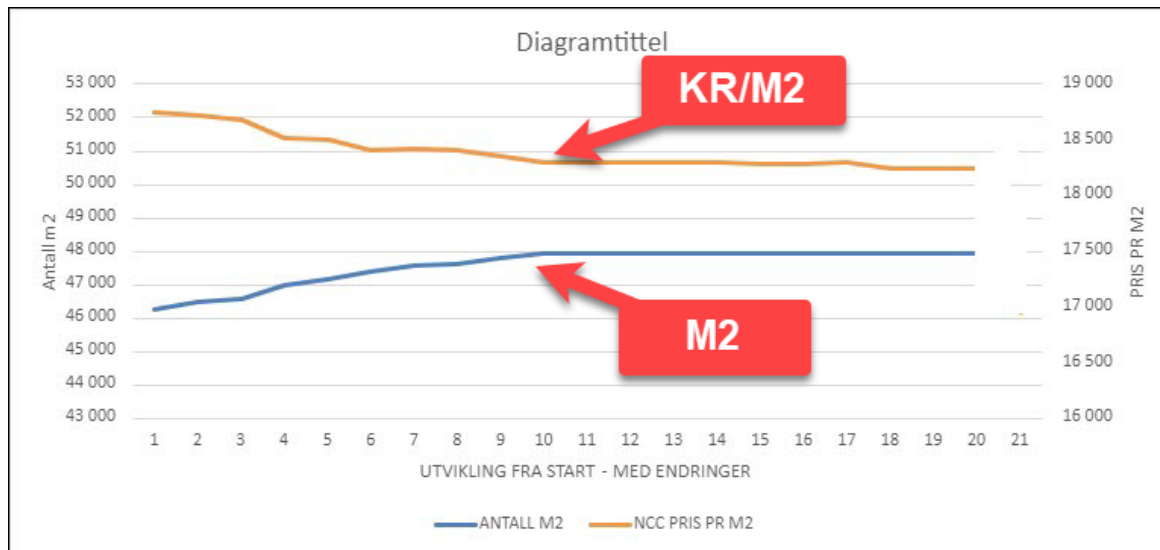
januar 2022

BIM and digital interaction

- 30 models in total
- Calculation of areas are taken from the BIM-model
- Basis for cost calculations directly from BIM early on
- Provisory actions made visible in the model
- Area increased by approximately 1050m² through meetings

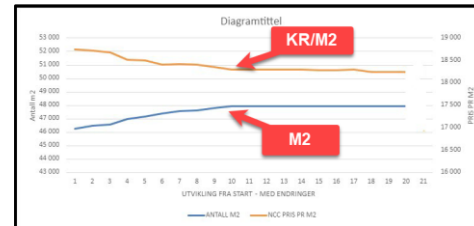
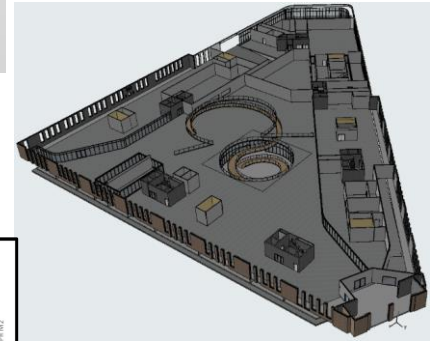
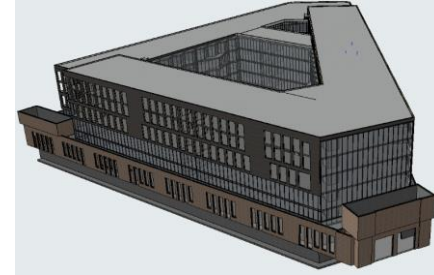
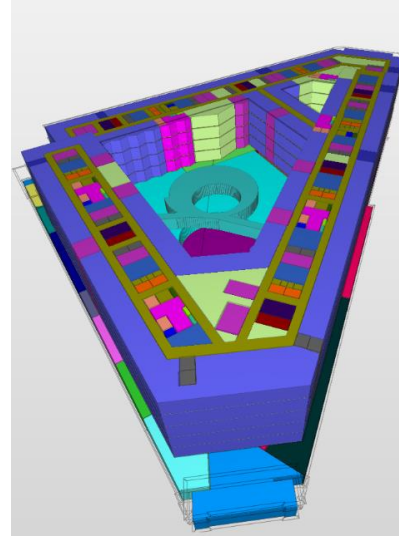


Metrics in the project



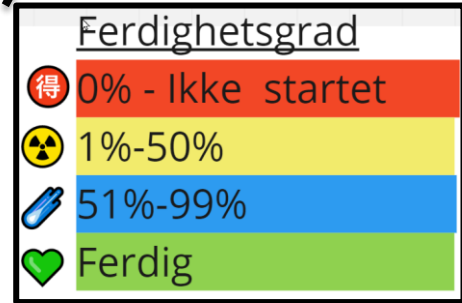
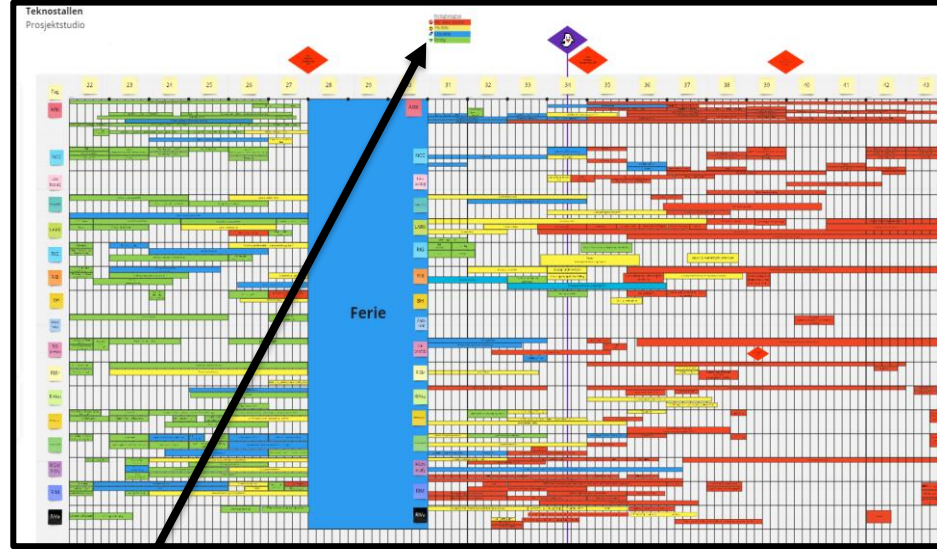
BIM - process

- Weekly reviews ahead of ICE-meetings
- Everyone deliver their model on Friday
- NCC compiled the BIM-model Monday morning, and everyone had to be prepared for the meeting on Tuesday
- Tuesday 09 o'clock: review of cases and events
- Communication through BIM-colab
- Effect:
 - The design of building made visible for everyone, progress and creativity in these meetings increased number of square metres.

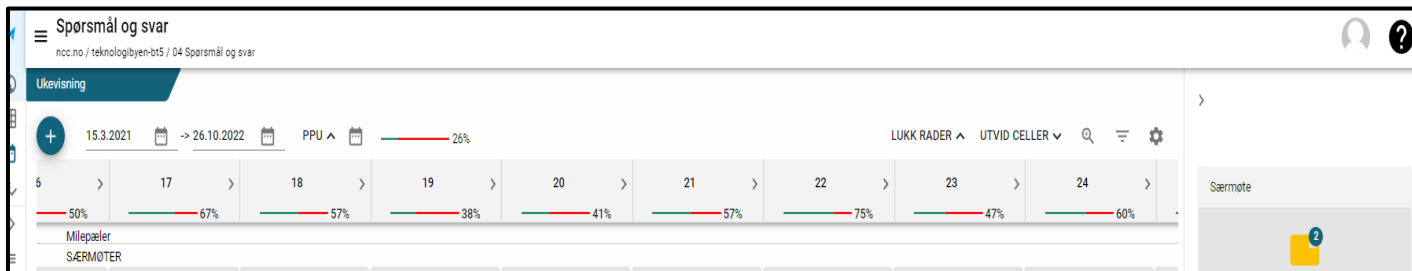


Schedule of building design - PPM

- Progress of deliveries in Miro
- Every engineer updated their progress ahead of the meetings and made potential deviations visible
- Weekly control of plan in ICE-session
- Deviations are coordinated and adjusted during the meetings
- Deviations from the plan became the starting point for the planning of next ICE-session.



PPM, tasklist



- **Tasklist**
 - Needs are made visible with responsibility and a deadline
 - Deadline is coordinated
 - Increased flow of information + reduction of mail correspondence
- **Measured PPU on completed task weekly**
 - Achieved an average completion of 55%
 - Action when there where deviations from plan
 - We discovered and handled the deviations early on by focusing on the result from the measurements.

	Titel	No.	Frist	Fix	Til	Beskrivelse
	Onlog	Selv Valn kan utføre reg.	0281	30.05.2021	HC_prosjektledelse	Breem Well
	Øke utleiebart areal i kjøleeren	Øke lagervare/utleiebart a...	0058	04.04.2021	NCC PGL	ARK
	WELL-særmøte Sound	Det er behov for en glømsk...	0203	23.04.2021	Breem Well	SÆRMØTER
	WELL-særmøte ARK og LARK	Det er behov for gjennomg...	0253	19.04.2021	Breem Well	SÆRMØTER
	WELL-særmøte RØVtor	Behov for WELL-særmøte ...	0179	18.03.2021	Breem Well	SÆRMØTER
	WELL-særmøte RIE og lys	Behov for WELL-særmøte ...	0180	18.03.2021	Breem Well	SÆRMØTER
	WELL-særmøte NCC og KLP	Det er behov for særmøte ...	0254	14.04.2021	Breem Well	SÆRMØTER
	WELL-krav støttestiv	Har spurt om dette på mail...	0435	29.09.2021	RÅku	REV VENT
	WELL-krav i non-leased spaces	Spørsmål til TWEL: The pro...	0260	30.04.2021	Breem Well	REV VENT
	WELL-krav i non-leased spaces	Spørsmål til TWEL: The pro...	0261	30.04.2021	Breem Well	RIE
	WELL-lemmer REV-vent til oppfølging	Overstikt ligger i mappe 10...	0252	09.04.2021	Breem Well	REV VENT
	WELL-lemmer REV-vent til oppfølging	Overstikt ligger i mappe 10...	0251	09.04.2021	Breem Well	REV ROR
	WELL W06 tilgang til arkivsystem	Arkitekt må tegne inn mini...	0412	31.08.2021	Breem Well	ARK
	WELL Sound - Suke om AAP	Det er planlagt å ta 0,5+...	0451	28.10.2021	RÅku	Breem Well

VDC in Teknostonen



Customer objective - CO:
Create a landmark that is attractive for the rental market

Client Objectives

Project Objectives

Project objective - PO:

- **Cost: 17 000 NOK/m²(-10,5%)**
- **Area increased by 1050m²(+2,5%)**
- **NCC and KLP have agreed on a turnkey contract - december 2021**

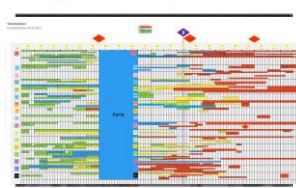
ICE- Integrated Concurrent Engineering:

- **Co-location and 25 ICE-sessions completed**
- **Every decisionmaker easily accessible**
- **Well planned and executed ICE-sessions**



BIM and digital interaction:

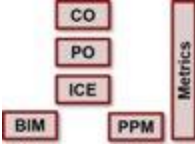
- **BIM actively used in every meeting**
- **BIM from all sub-contractors updated and coordinated weekly**
- **Area and cost based on data from BIM**



PPM - Project Production Management

- **Building design plans checked and adjusted weekly**
- **Interdisciplinary tasklist checked and coordinated weekly**
- **Weekly review of the model and coordination ahead of ICE-meetings**
- **Every initiative evaluated quickly according to cost & effect**

VDC i Teknostallen



Key-takeoff

+

Collocation with client/architect++ was a new experience for everyone on the project and resulted in positive effects, clear goals, fast decisions, «everyone in the same boat»

«We dont see any other way we could keep up the progress without using VDC-methodolgy in this type of complex projects.»

Head of project, NCC, Trond Espen Lorentsen

Delta:

- **MIRO vs automatisering**
- **Spesifisere forventninger til mengde samlokalisering i avklaringsmøter**
- **Mere opplæring i bruk av fellesverktøy(Interaxo, MIRO, Kvist)**
- **Parametrisk design**



Takk for meg

Erik Langørgen
NCC Building Norge AS

