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Lean Rakentamisen Päivät

Presentation
Hans Thomas Holm

Wednesday June 4th 2025

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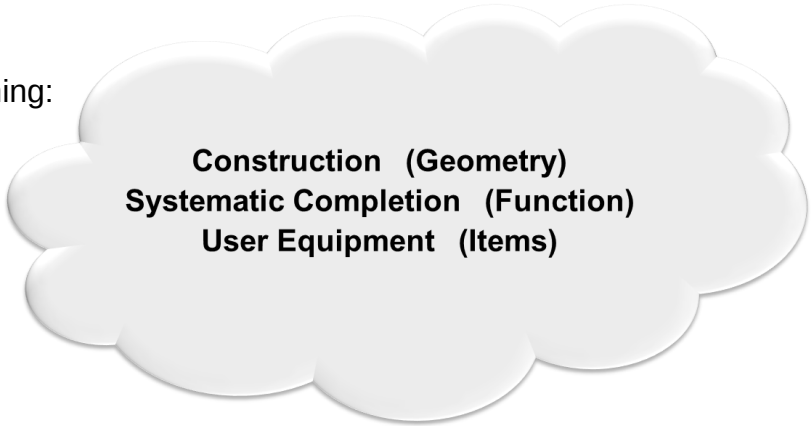
Experiences from The Life Science Project

From Design to Completion

- **Design Management**
- **Geometry & Functionality – MMI & FMI**
- **Visualize and Repeat**

From day 1 combining:



One of Norway's Largest single Buildings

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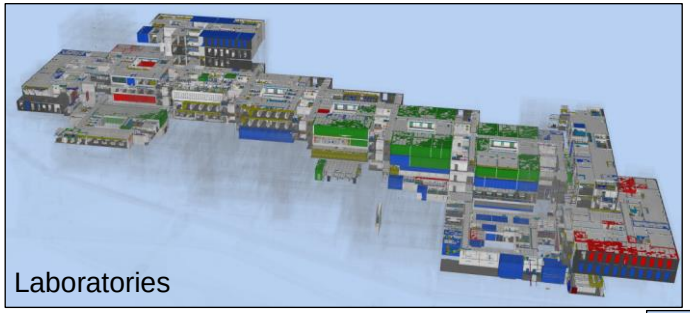
Interior Design: Break Down Structure

Team 1

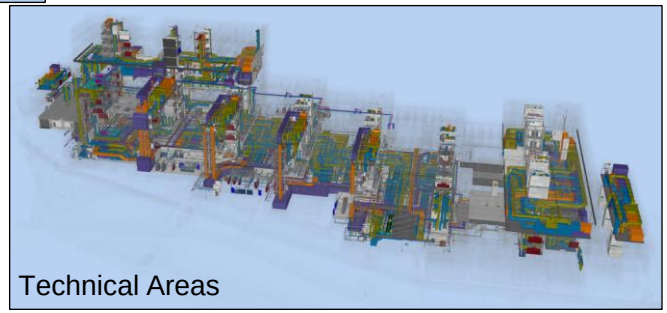
Offices and Common Areas
approx. 32,000 m²



Team 2

Laboratory Areas
approx. 33,000 m²

Technical Areas
approx. 34,000 m²



Team 3

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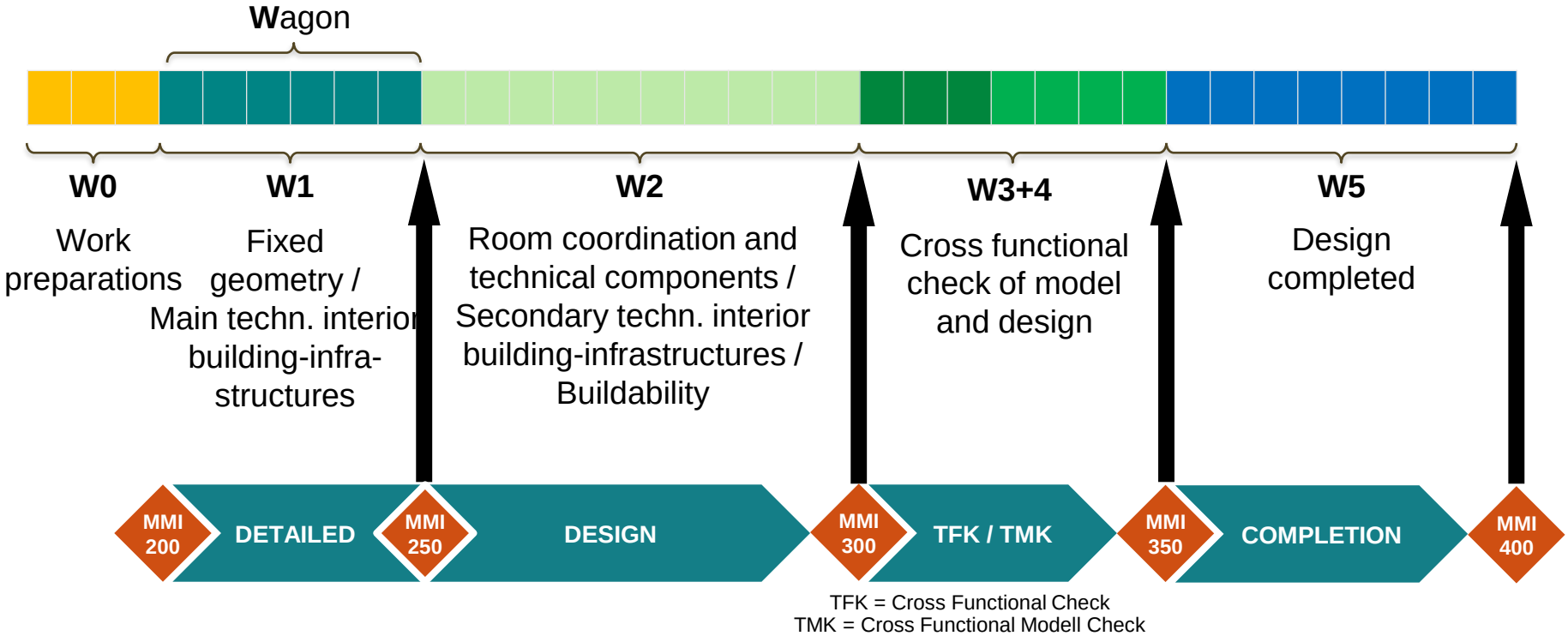
“Takting” Design at Life Science

incl. Systematic Completion and User Equipment Utilizing MMI

MMI = Model Maturity Index



TFK = Cross Functional Check
TMK = Cross Functional Modell Check

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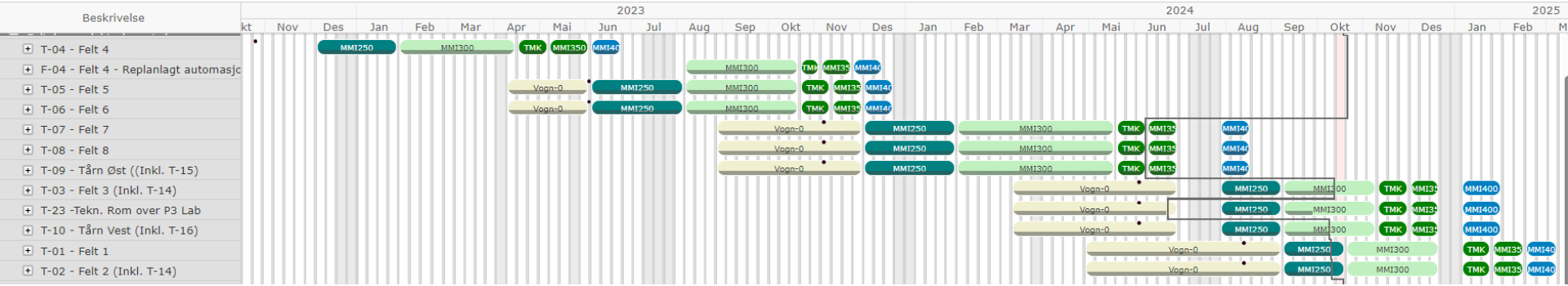
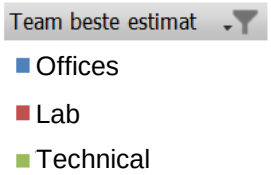
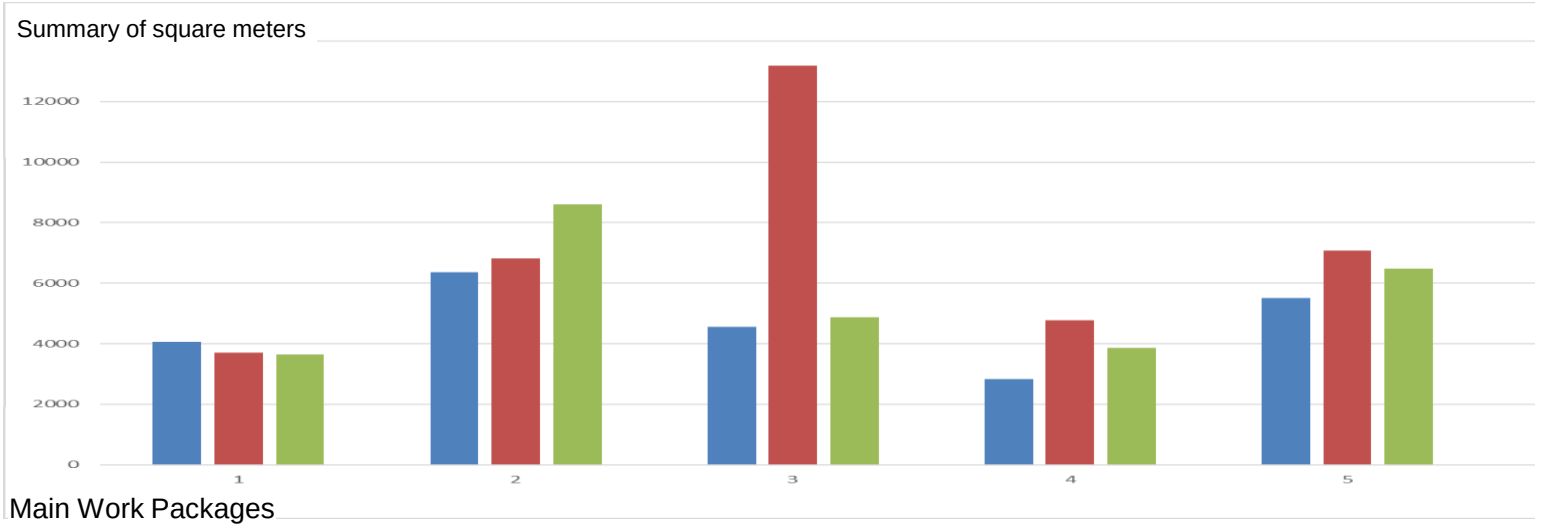
Interior Design: Workload Estimate







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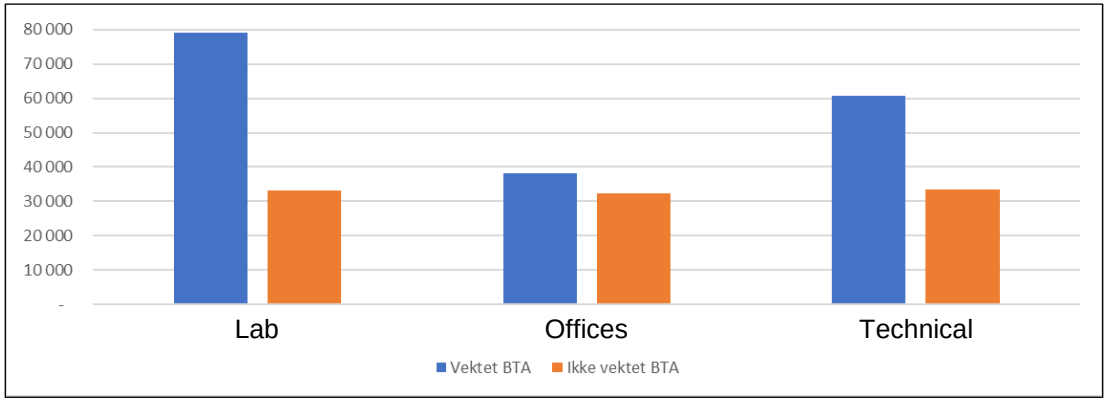
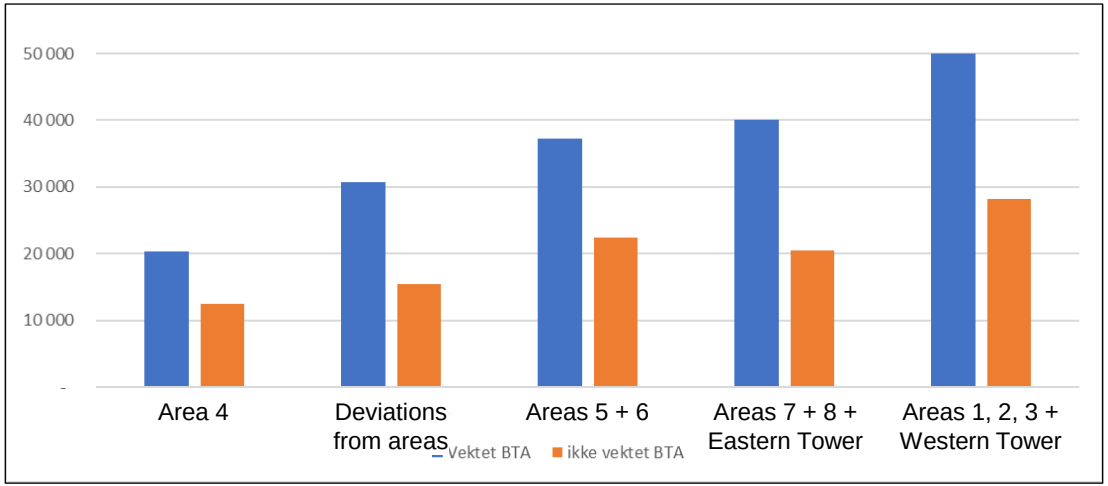
Comparing workload distribution

Weighted vs. Non Weighted BTA

Distribution pr. Design Team



Distribution pr. Work Package



Weighted workload = Calculated time based on estimated difficulty degree for different areas.
From ‘easy’ to ‘challenging’ factored 1 to 4.

Workload ≈ Time ≈ Cost

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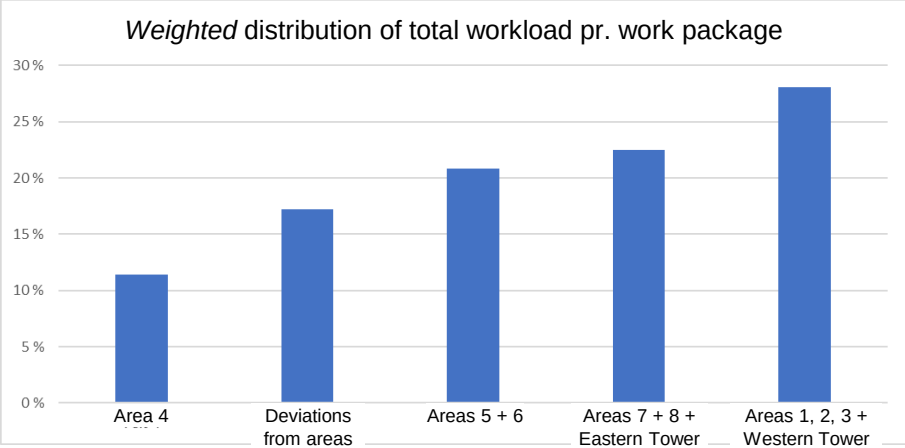
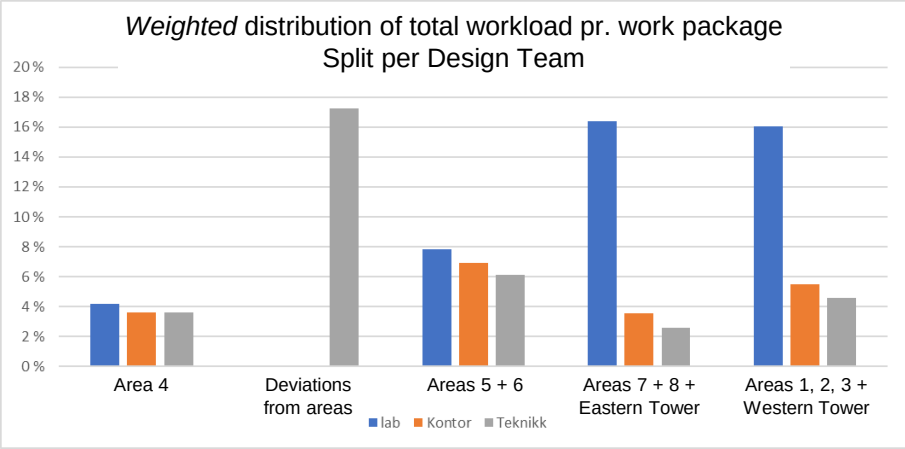
Estimated distribution of total workload



Work package workload is increased due to repetitive efficiency effect



Visualizing split pr. Design Team

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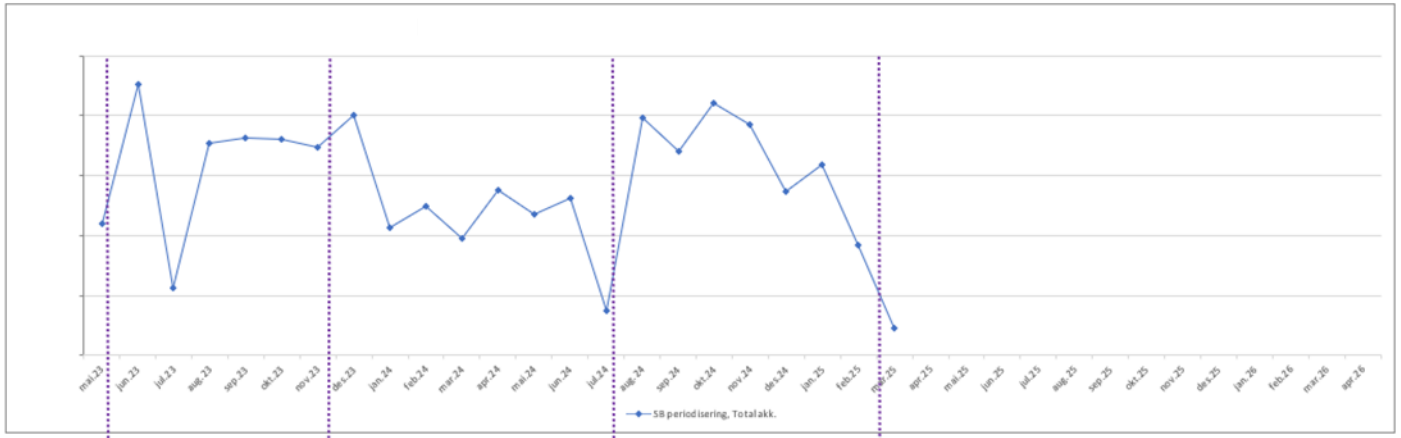
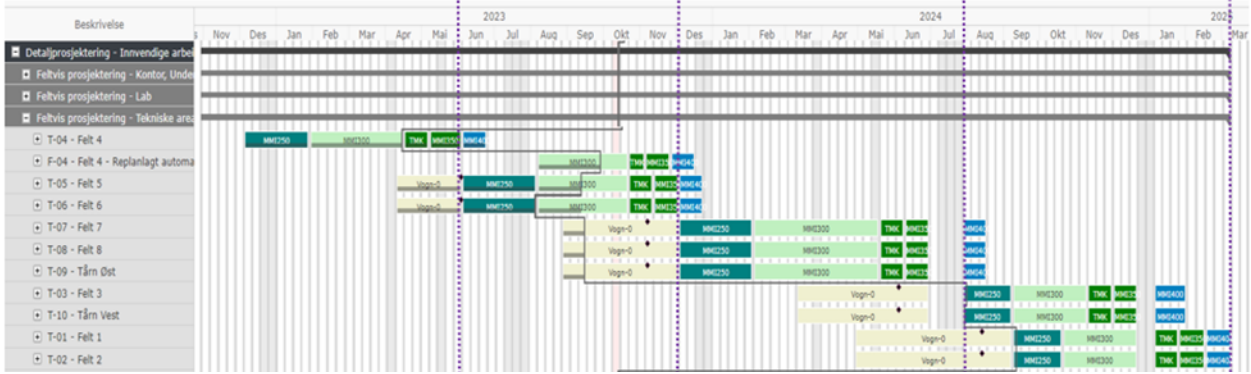
Weighted total workload distribution

Statsbygg Calculations





Workload ≈ Time ≈ Cost

Distribution ≈ Periodizing

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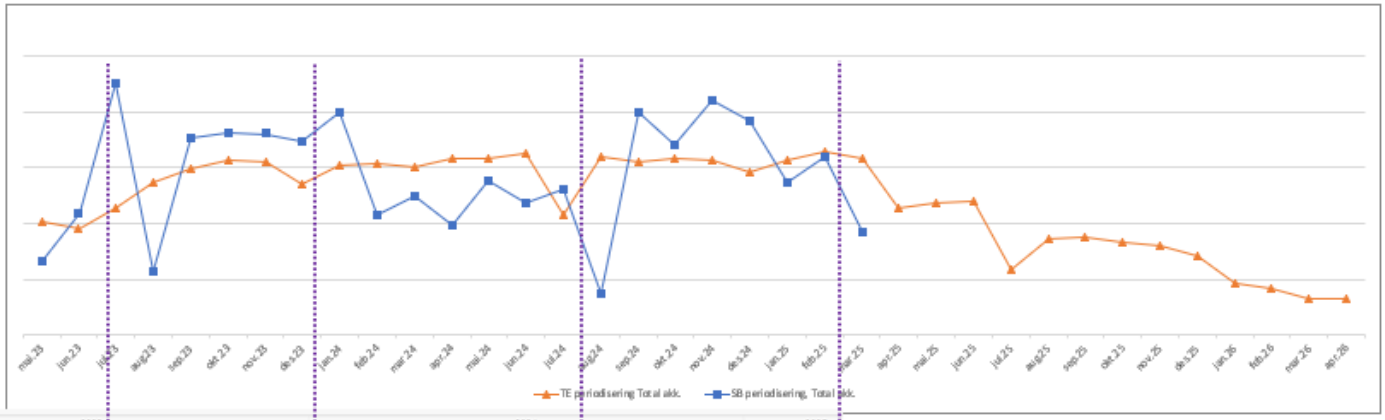
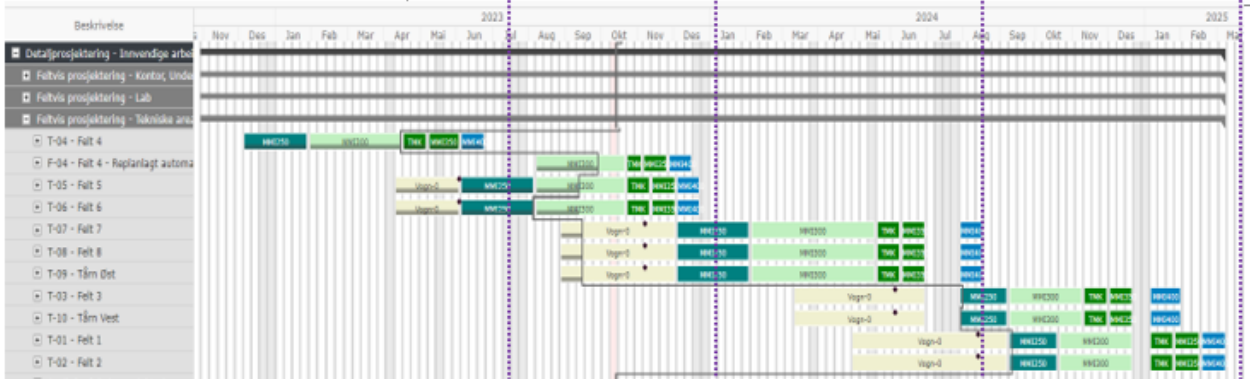
Weighted total workload distribution

Statsbygg vs. Contractors Calculations





Workload ≈ Time ≈ Cost

Distribution ≈ Periodizing

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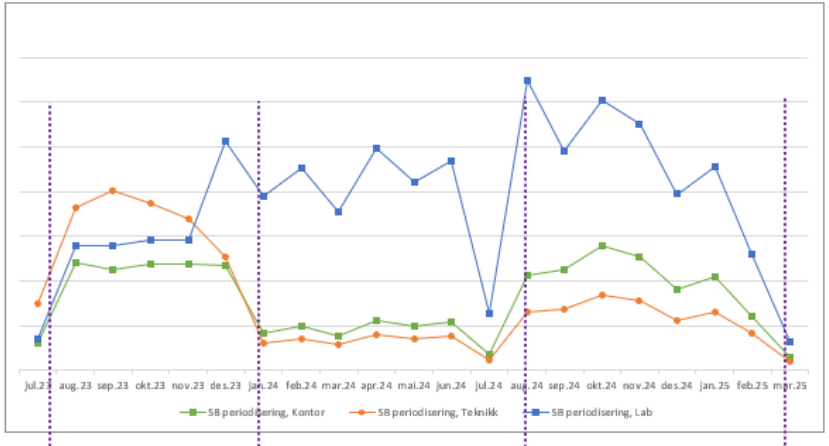
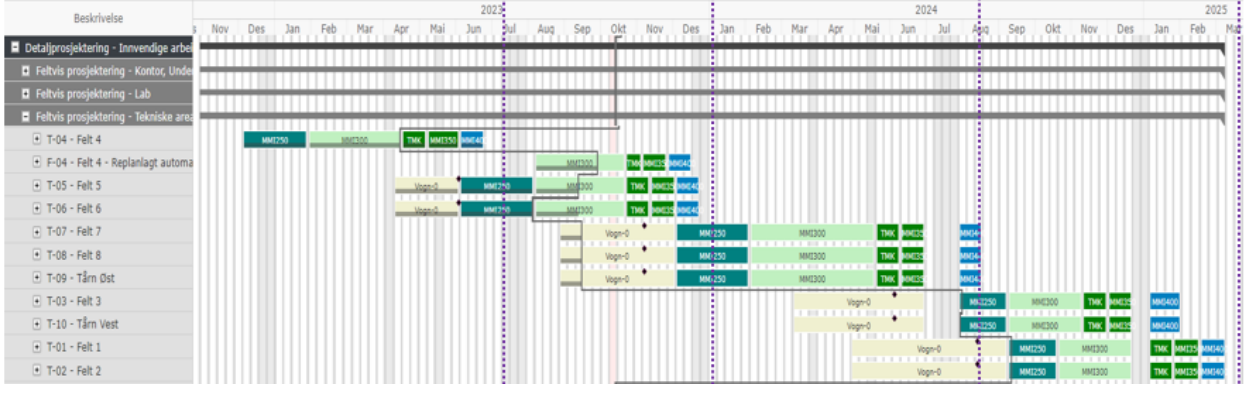
Weighted total workload / Design Team distribution

Statsbygg Calculations





Offices Team

Lab Team

Technical Team

Workload ≈ Time ≈ Cost

Distribution ≈ Periodizing

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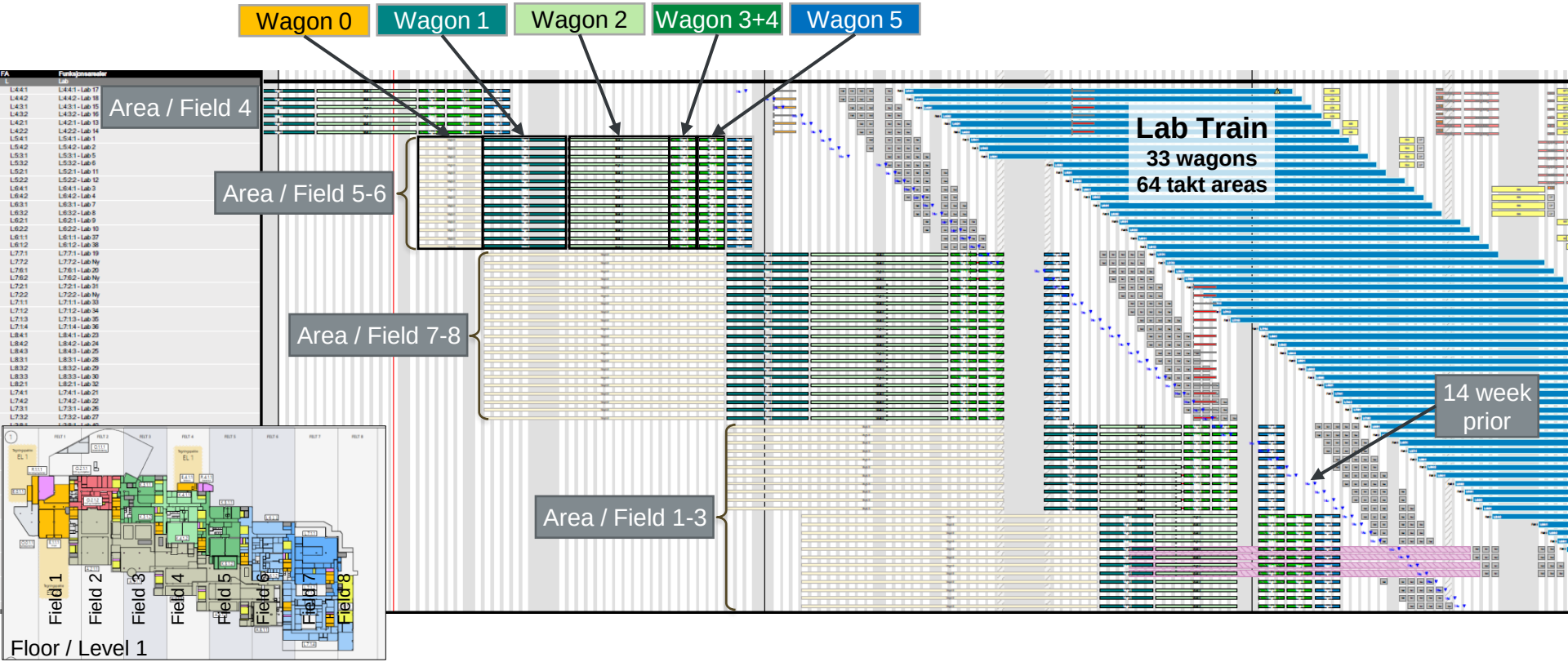
Takt Plan in Design

incl. Systematic Completion and User Equipment



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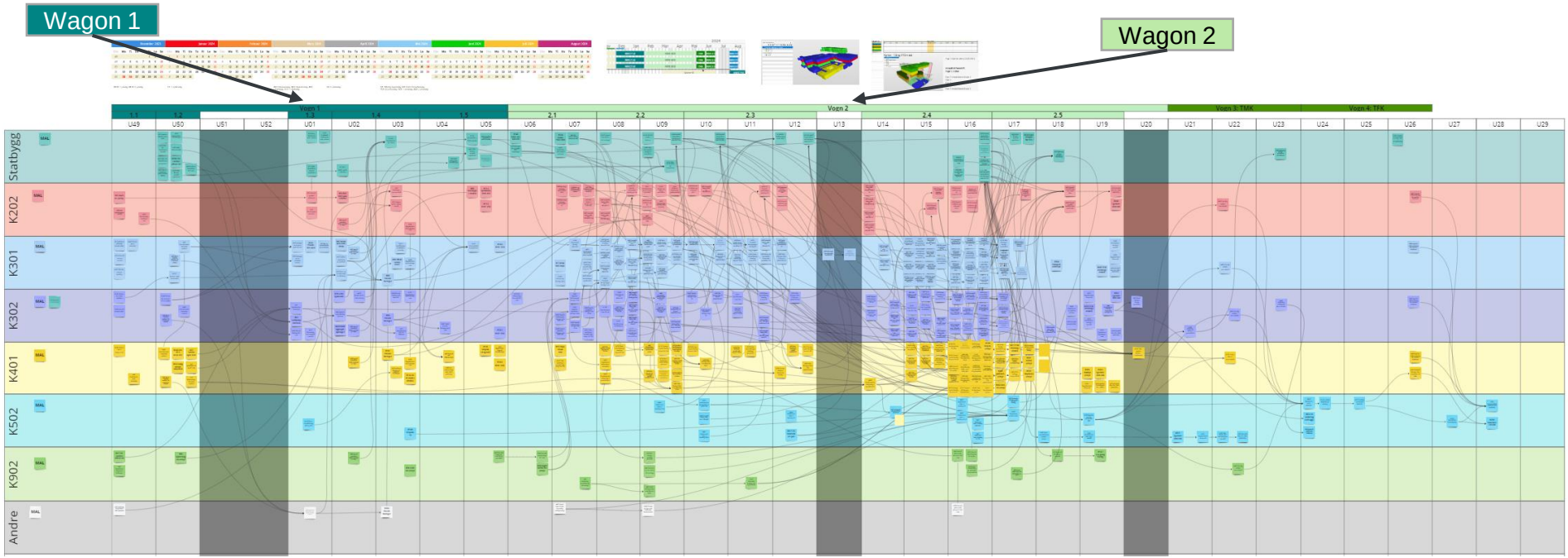
Planning of Deliveries (Wagons 1 and 2)

Swimlane Deliveries



Tool: Miro

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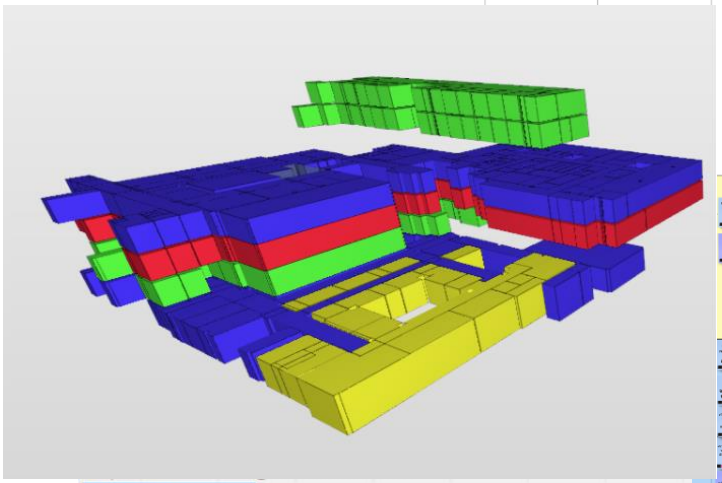
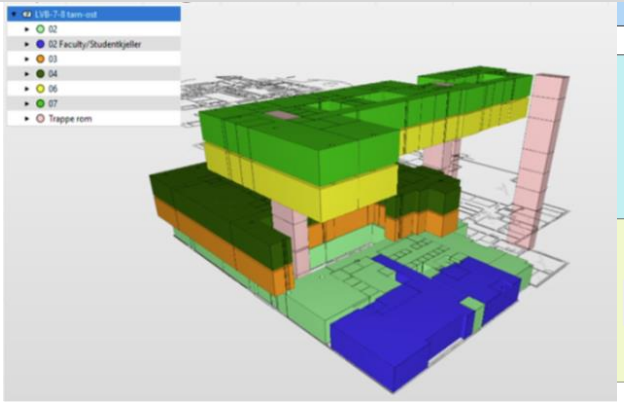
Detailing Design Delivery Sequence (Wagon 2)

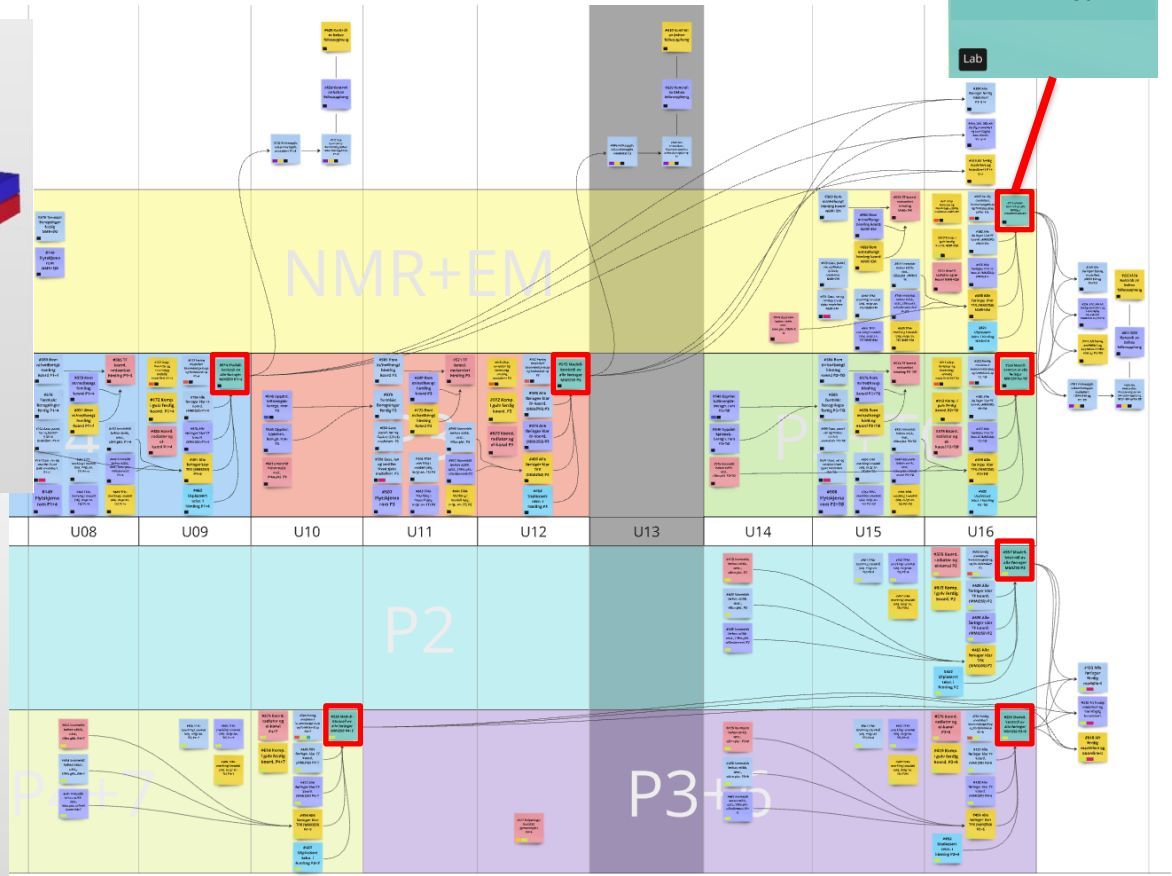
incl. model check at the end of each cycle

#513 Model check of all service routes MMI 250

Lab







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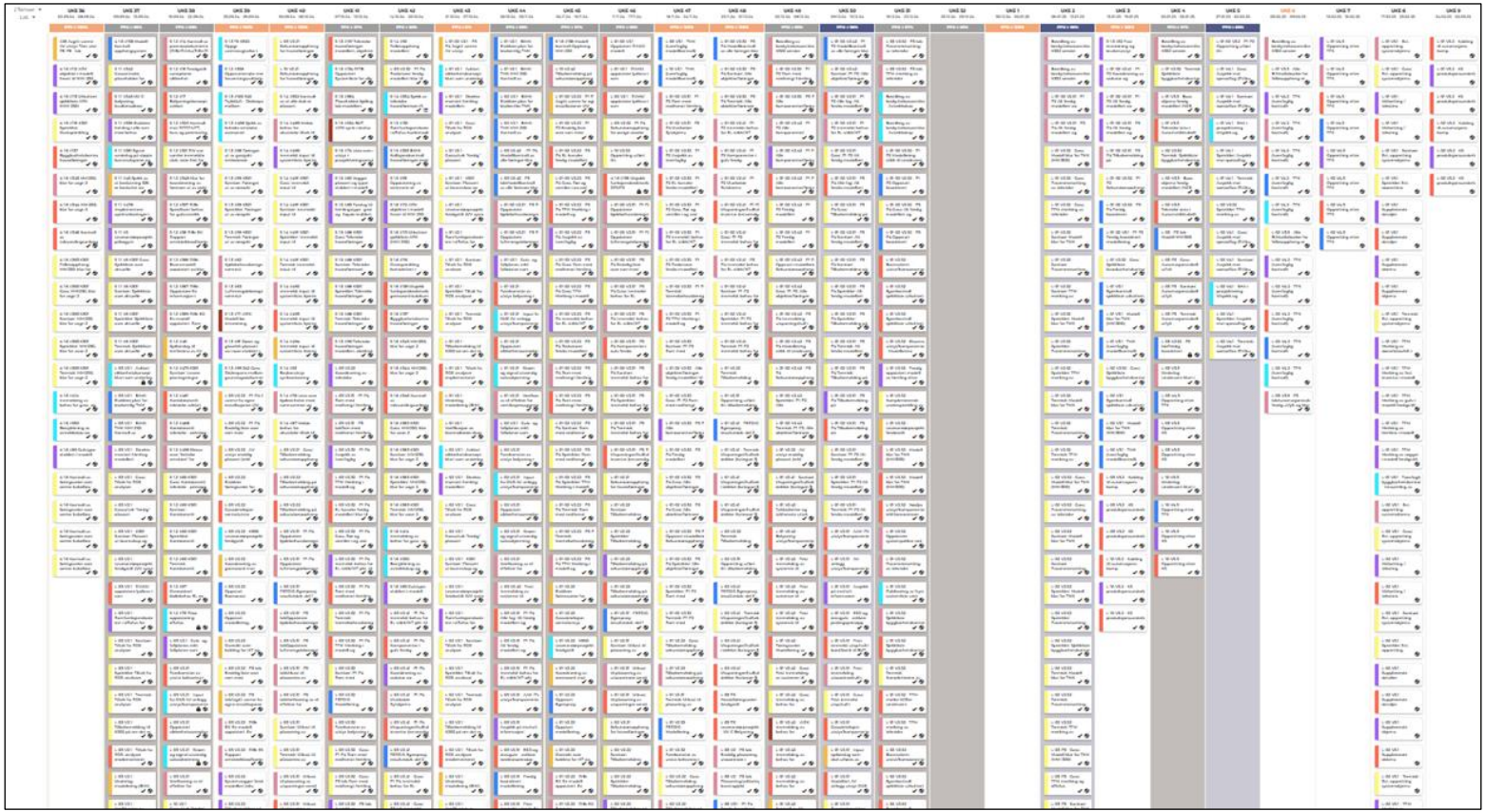
Delivery Management



Tools: TaskCtrl / dPlan


Taktarea L.5.3.1
Week 05-2025

Taktarea R.K3.1
Week 05-2025


Taktarea L.4.2.1
Week 07-2025

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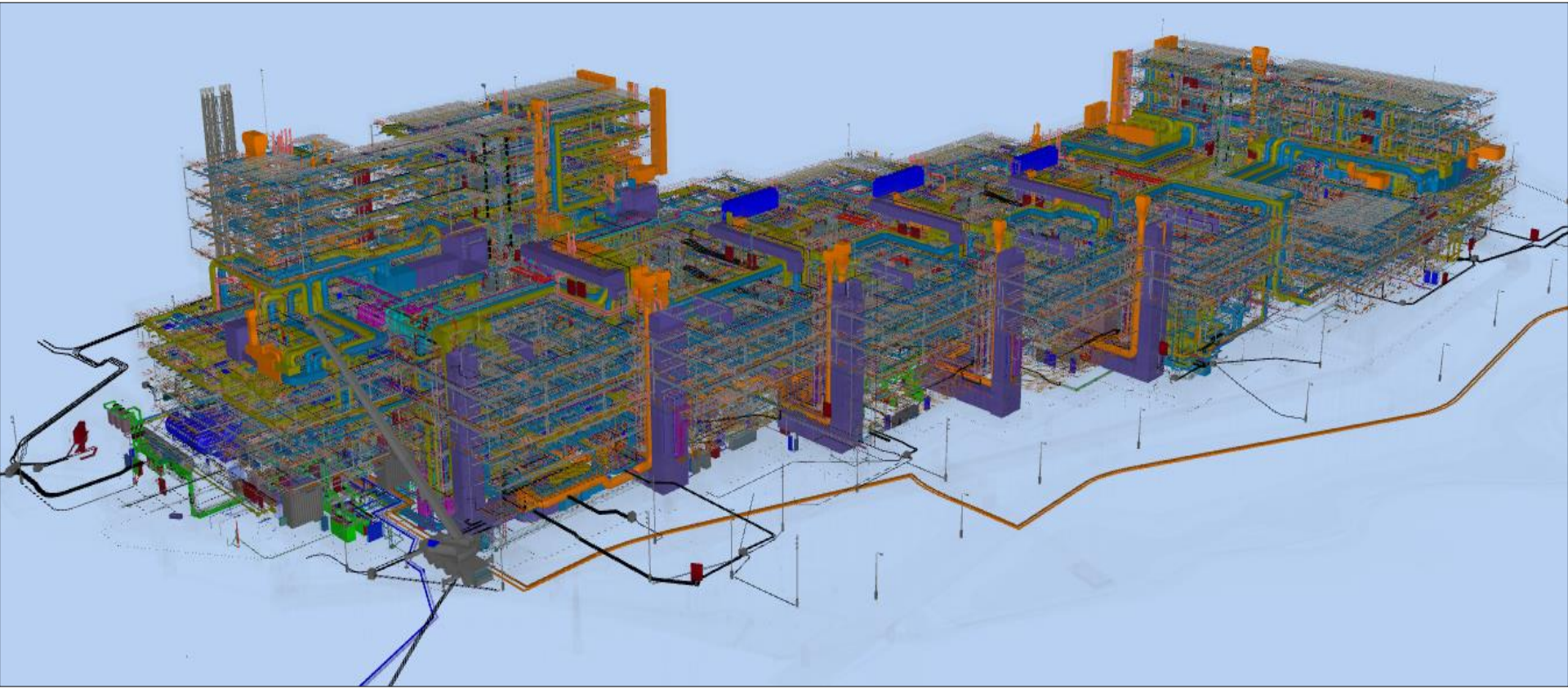
A Complex Giant Machine



Close to 3,000 technical systems

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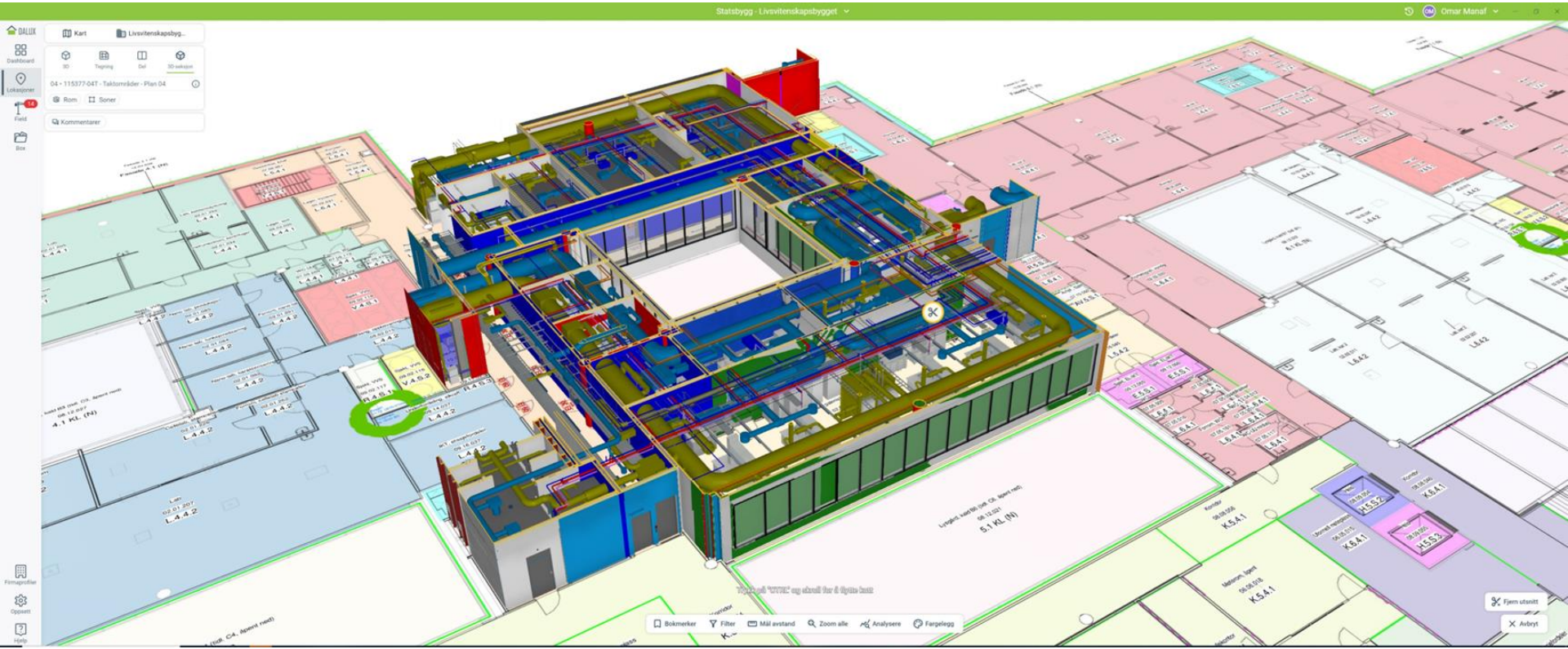
Geometry vs. Systems



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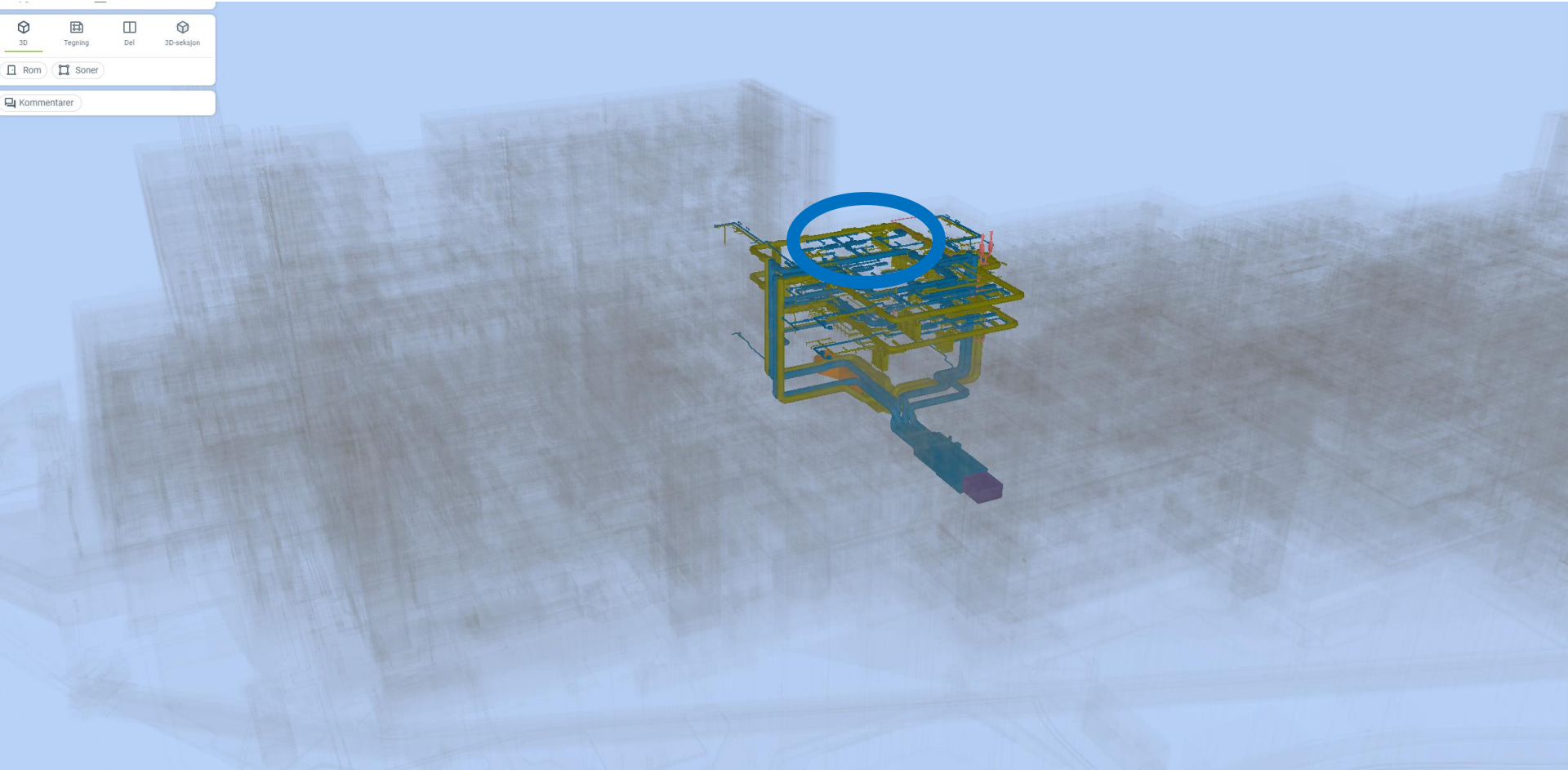
Example Ventilation System



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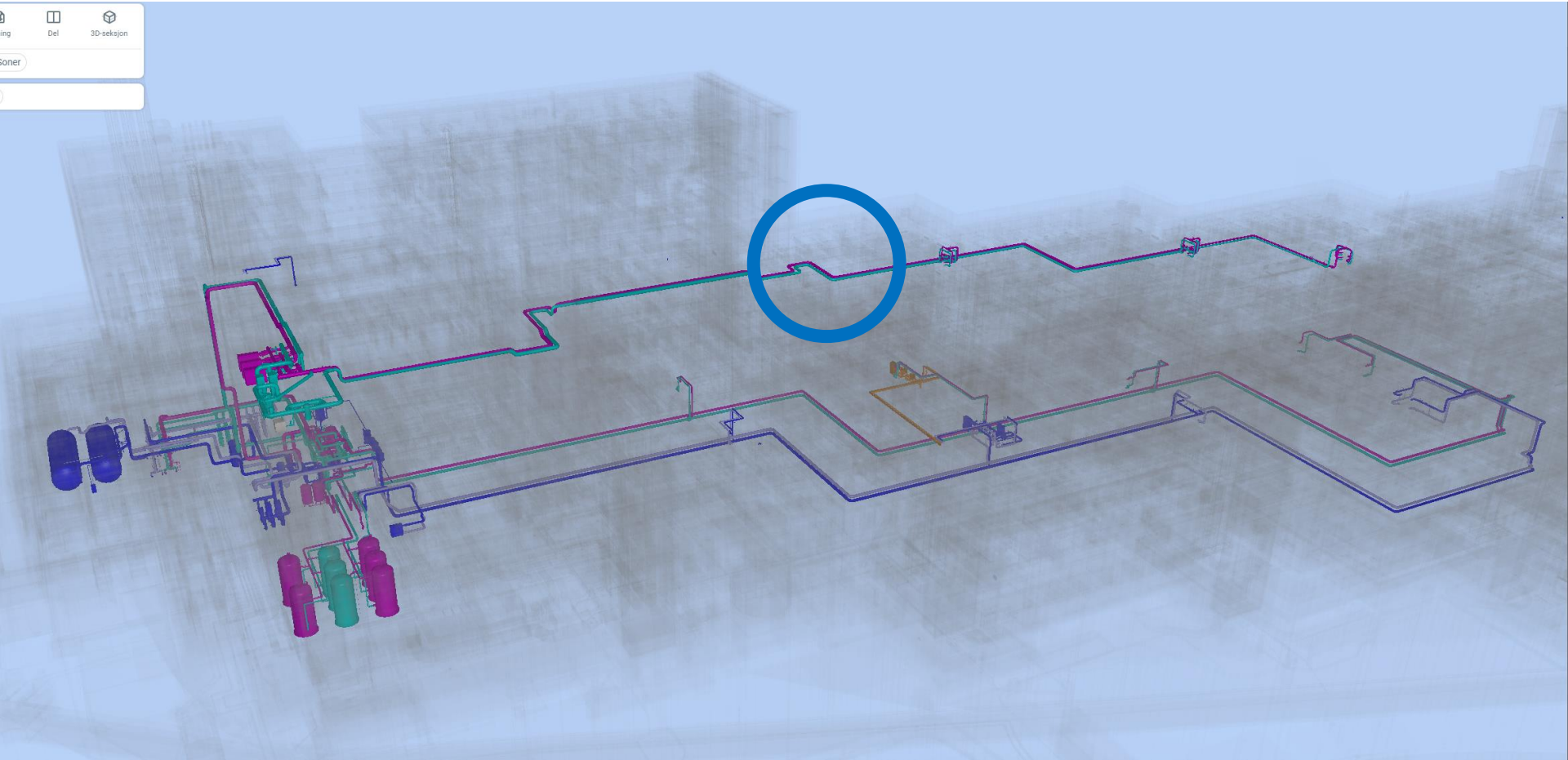
Example Heating/Cooling System



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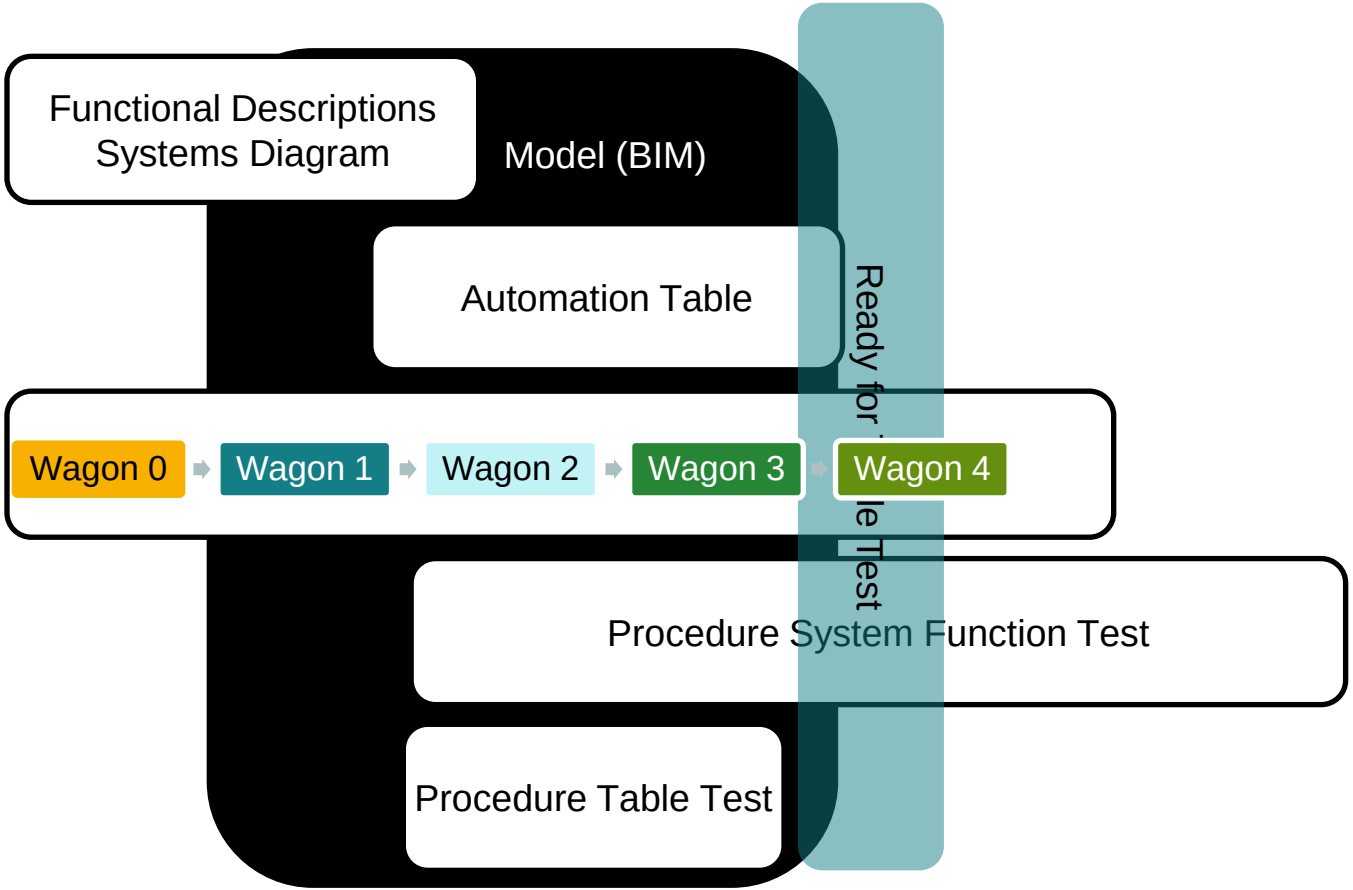
Systematic Completion in the Design Train



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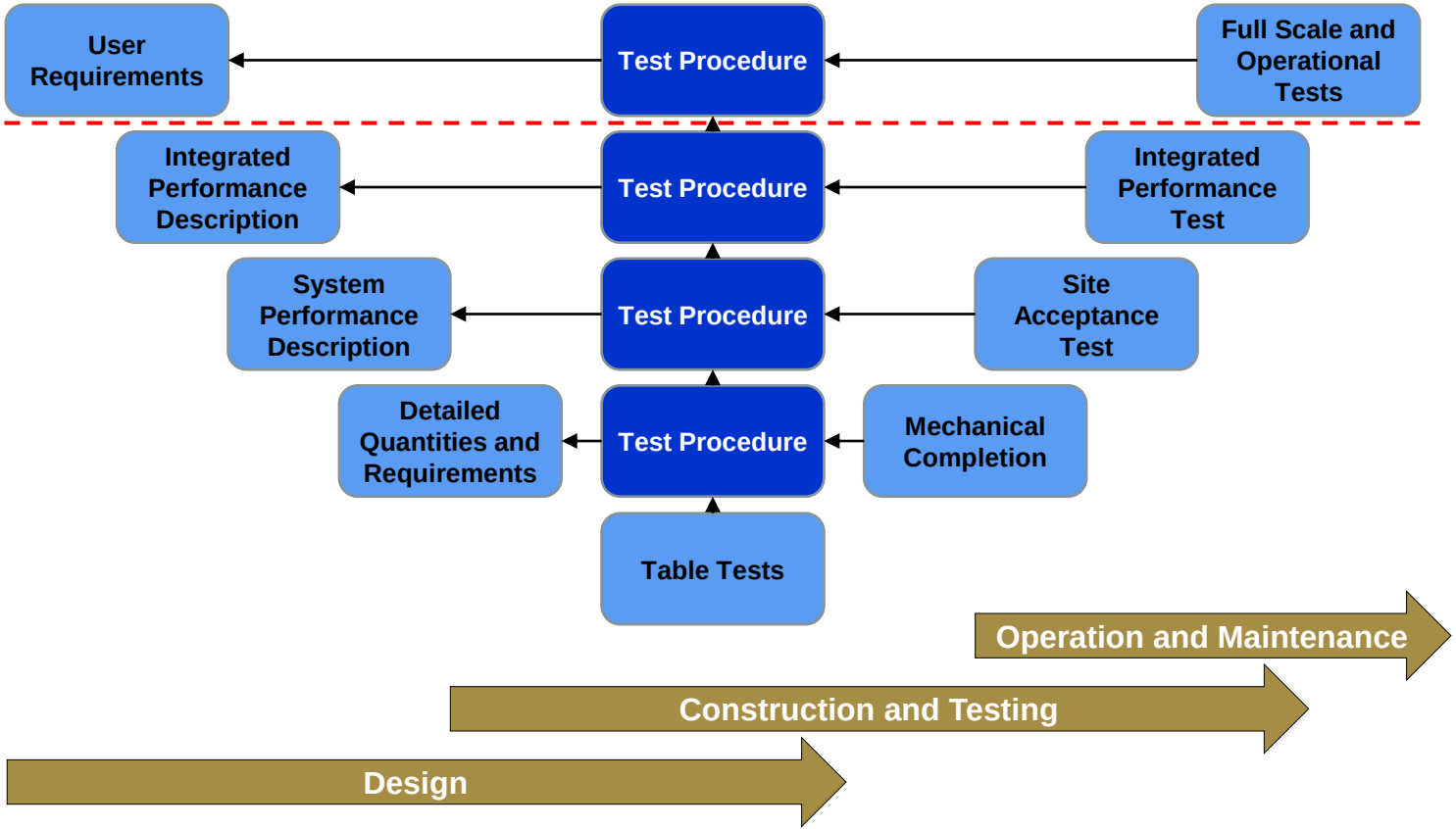
The «V-model»



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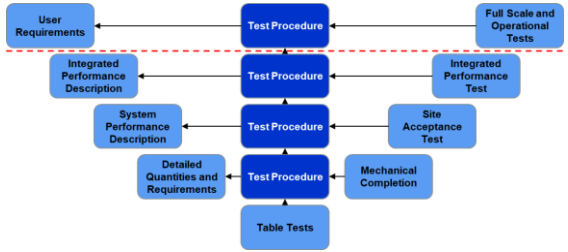
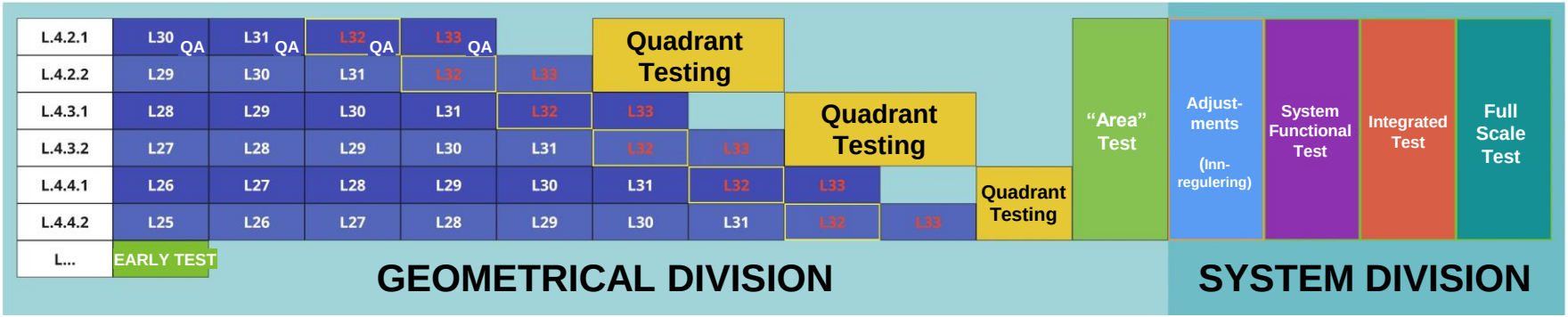
The Test Process

- Own Control (QA) in “Main Trains”
- Early test
- Area test
- System Functional Test
- Integrated test
- Full Scale Test





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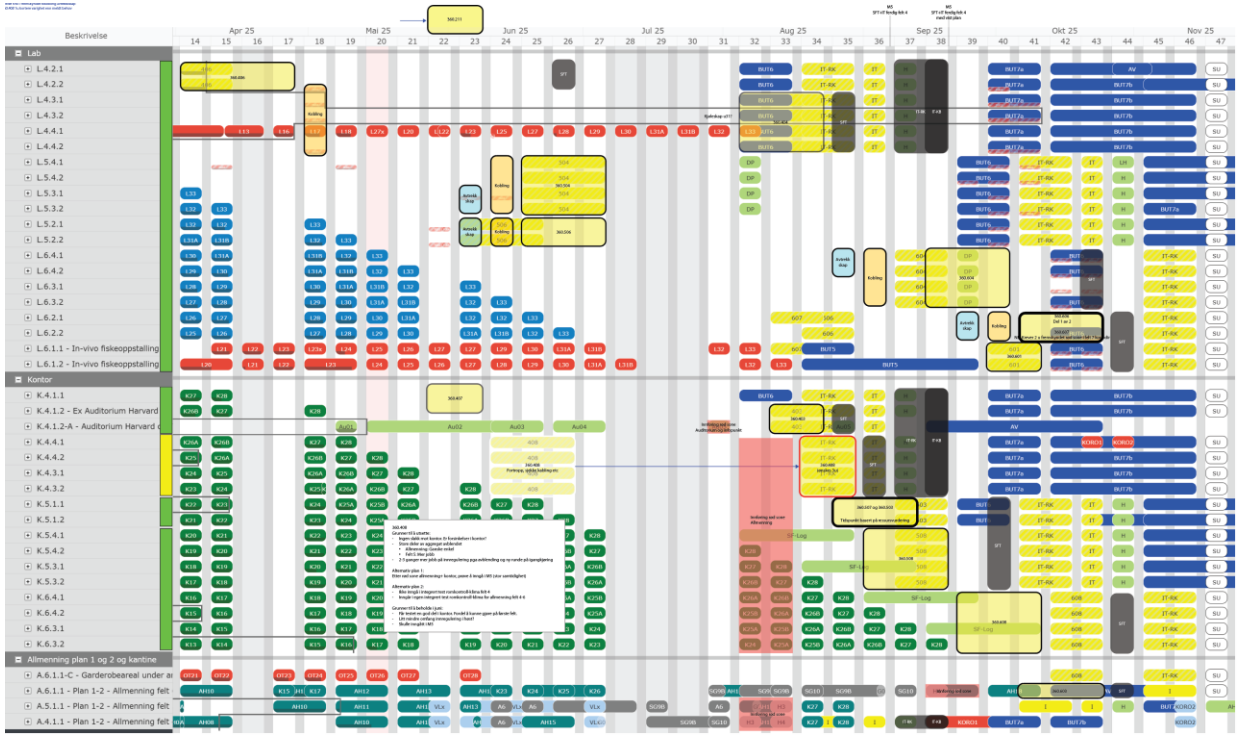
From Construction to Start up to Handover



Takt Areas

Wagons (geometry)

Testing of Systems (functionality)

Well-coordinated plans needed for:

- Start up of systems
- User Equipment
- Remaining arrears (work)

Everyone involved must have the same focus and direction, in the interface between geometry and functionality.

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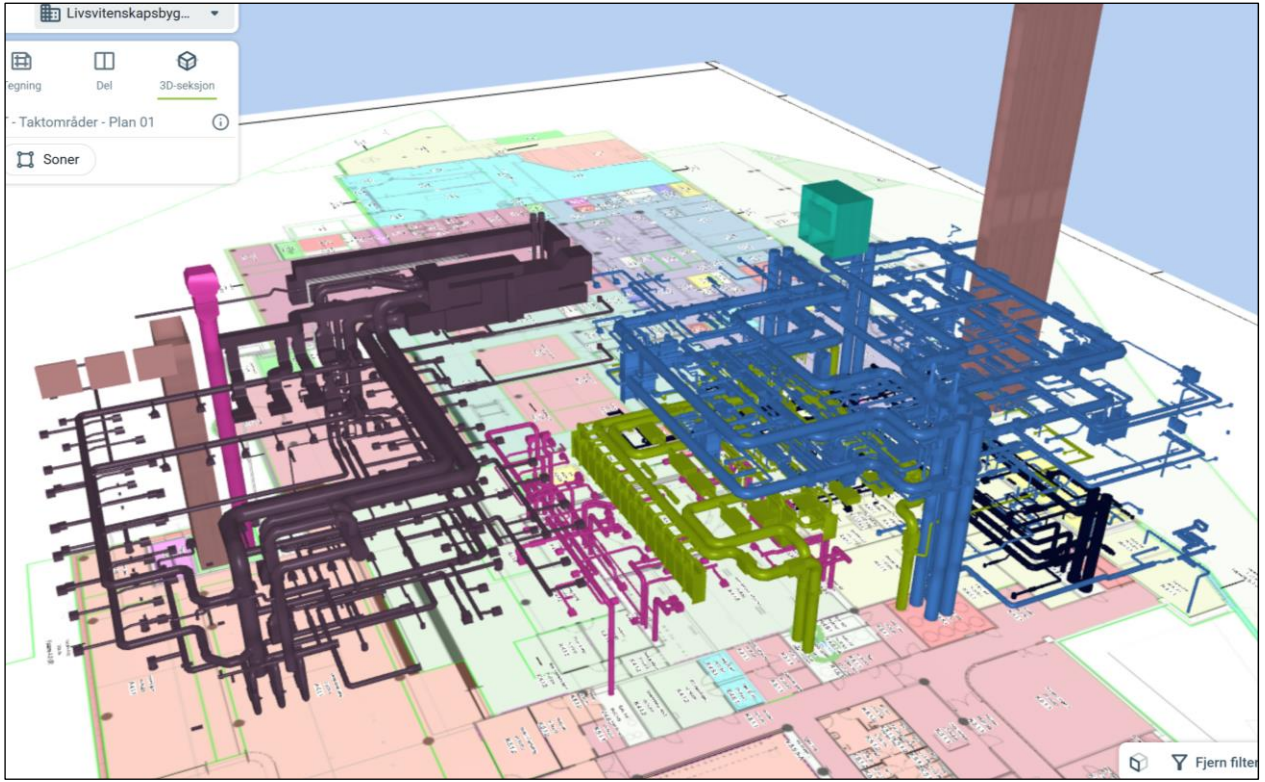
System Functional Tests

Area 4, Floor 1

SFT must be completed
before
Integrated Tests can start



Five ventilation / air exchange
systems, each with its own colour

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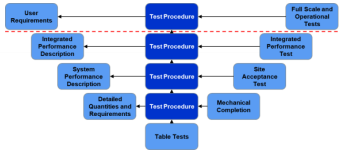
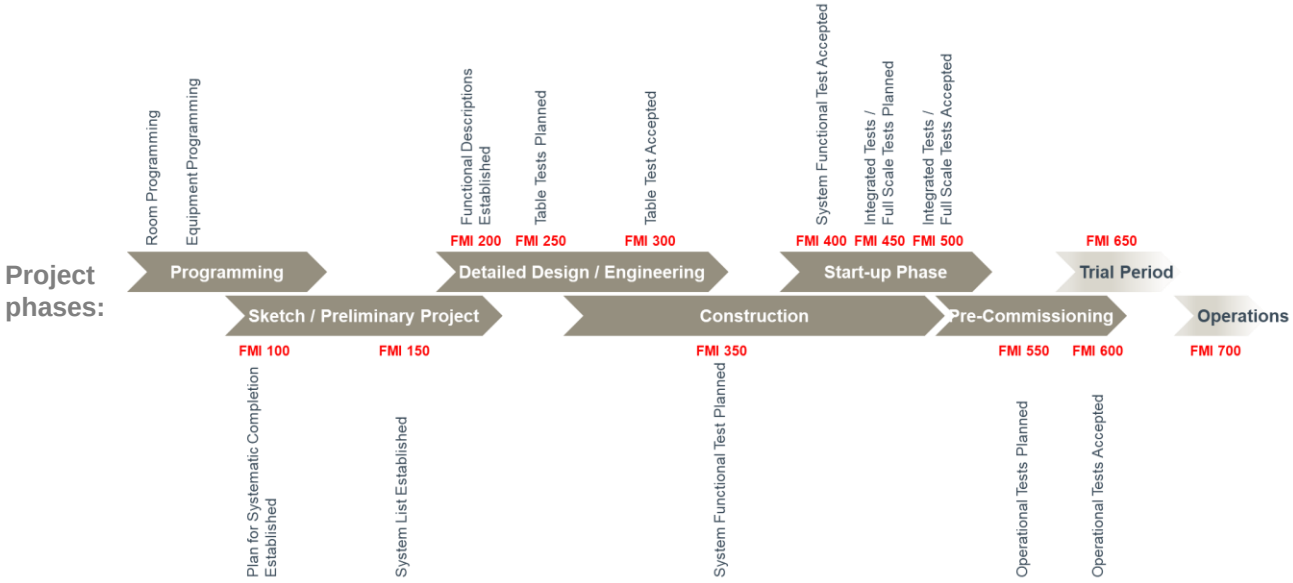
Systematic Completion

FMI = Functional Maturity Index





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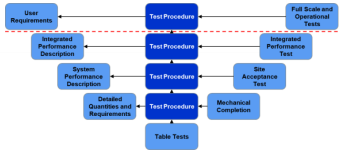

Systematic Completion

FMI = Functional Maturity Index

Main Levels

- FMI100 – Plan for systematic completion established
- FMI200 – Functional description per system completed
- FMI300 – Table test accepted
- FMI400 – System functional test accepted
- FMI500 – Integrated tests / Full scale tests accepted
- FMI600 – Business tests accepted
- FMI700 – Normal operation

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Visualize and Repeat

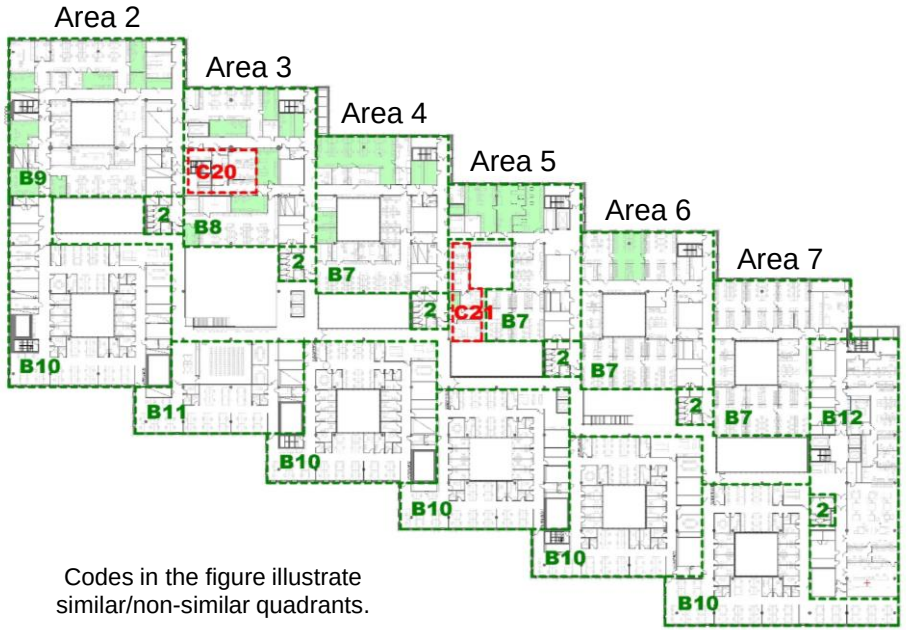
Systematic Completion

Repeatable design allows for **repeatable construction** and **repeatable testing**

A sectioned construction of the technical systems allows for:

- early **completion and testing**
- **continuous testing**
- **continuous learning and improvement**

No need to wait until the end of the whole construction.



Codes in the figure illustrate similar/non-similar quadrants.

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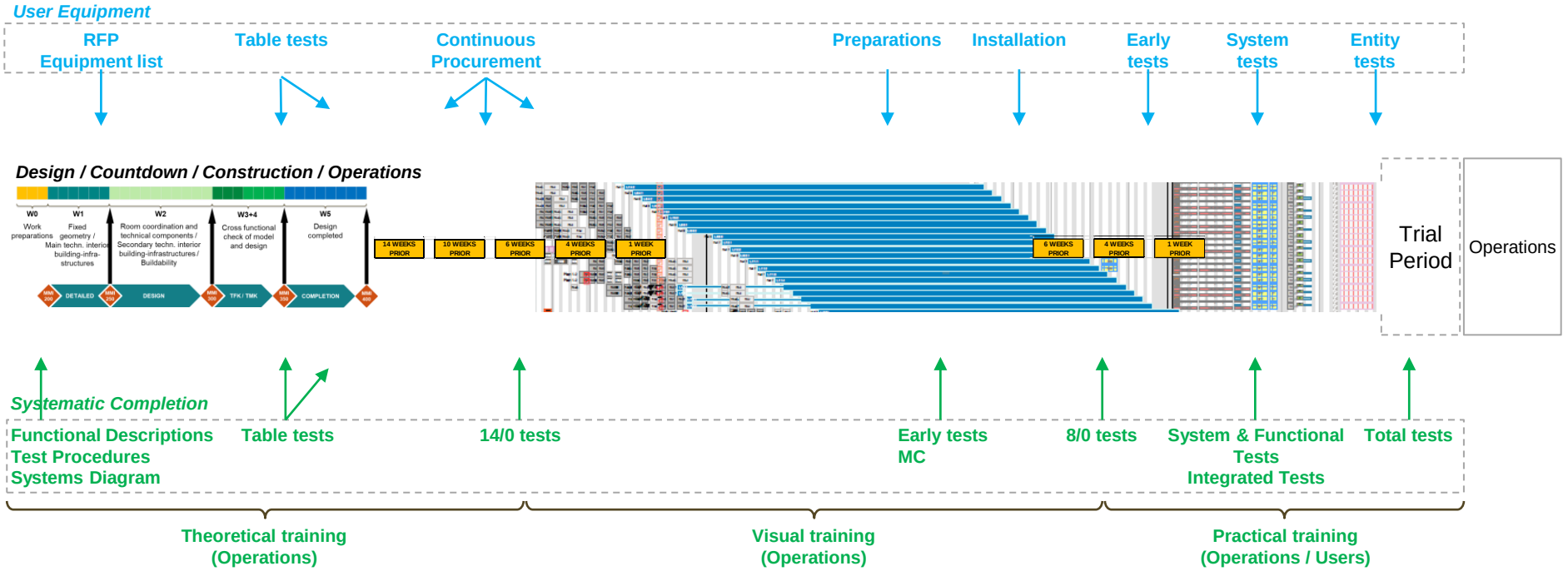
Geometry + Function + Equipment

Combined



Source: HT Holm & PR Johansen
Project Life Science

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Challenges for a better industry

How to think – and work – long-term in a project?

How to methodically and continuously improve processes?

How to work with functionality from the start?

How to include logistics even better?

How to keep the site clean and tidy – every day?

How to have a conscious mind on waste reduction?

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Thanks for your attention

Hans Thomas Holm / Statsbygg
Email: hansthomas.holm@statsbygg.no
Cell: +47 915 73 626
Linked In

Dec. 2014: Awarded Statsbygg's Innovation price
"Introduction of Lean principles in Statsbygg's construction projects"

Oct. 2017: Awarded "*Bygg 21"* for Best Practice

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Hans Thomas Holm / Statsbygg

Statsbygg	2007 –	
The road of LEAN projects	2010 –	#1 D-Medica, #2 KHiB, #3 Life Science
Torino winter Olympics	2004 – 2006	TOROC transportation
Lillehammer winter Olympics	1992 – 1994	LOOC transportation
Misc. Project Management	1991 –	

MSc	Chalmers Tekniska Högskola	1991
	Karlsruhe Technische Hochschule	1987
Christian August vidg.sk. / Halden		1982

5 languages

(* 1964)

D-Medica

KHiB