

LIPS2015 Barcelona

Lean in Public Sector Construction Conference

Session 2 Thursday Sep. 17 (11:30)

Case

Bergen Academy of Art and Design

Hans Thomas Holm

Statsbygg, Norway



BERGEN ACADEMY OF ART AND DESIGN (Khib)

- LEAN IN STATSBYGG
- LEAN IN THE Khib-PROJECT,
Khib EXPERIENCES

Barcelona, September 17th 2015
by H.T. Holm, Statsbygg, Norway



Statsbygg / Norway

- A public sector administration company
- Industry leader in construction and property
- Approx 850 employees divided between the head office in Oslo + five regional offices
- Norway's largest building commissioner and property manager in the civil sector
- Annual investments total around NOK 3 billion
- www.statsbygg.no



- **STATSBYGG – Construction**

- Planning / Designing / Managing
 - 160 simultaneous projects annually in Norway
-

- **STATSBYGG – Property management**

- Management and maintenance of state properties
 - 2.350 buildings in total on 600 properties in Norway and abroad
 - 170 foreign buildings (ie. embassies) from Beijing to San Fransisco
 - 2,7 mill. sqm
-

- **STATSBYGG – Consulting**

- Ensuring state interests in property development projects
- Advisors to all projects regarding efficient management
- Advisors on technical issues

Lean in Statsbygg

- Domus Medica, Oslo
- Bergen State-archive
- NHH, Bergen
- Urbygningen («The Clockbuilding»), Ås
- Haugesund prison
- Bergen Museum
- Academy of Art and Design (KHiB), Bergen
- Nordland University, Bodö

And more in the pipeline...

Successrate

Medium & Promising	First in Norway with takt.
Low	Experience: Must go all in.
High	Strong influence in city of Bergen.
Low to medium	Very high on BiM.
Very high	
Ongoing	
Ongoing & Very promising	
Ongoing	

Bergen Academy of Art and Design (KHiB)
Planned completion: May 2017



A LEAN-BiM project

Image by Snøhetta & MIR

KHIB FACTS

Projectstart and designcompetition	Autumn 2005
State fundings for final design and construction stages	June 2013
Total budget (pr July 2013)	1.038 mill. NOK (incl. VAT)
Floor space (pr May 2015)	14.800 sqm

Schedule

2015	Foundation works / Concrete works / Framework
2016	Enveloping / All interior works / Landscaping
2017	Scheduled completion May / Semester start August
	Trial period 9 months

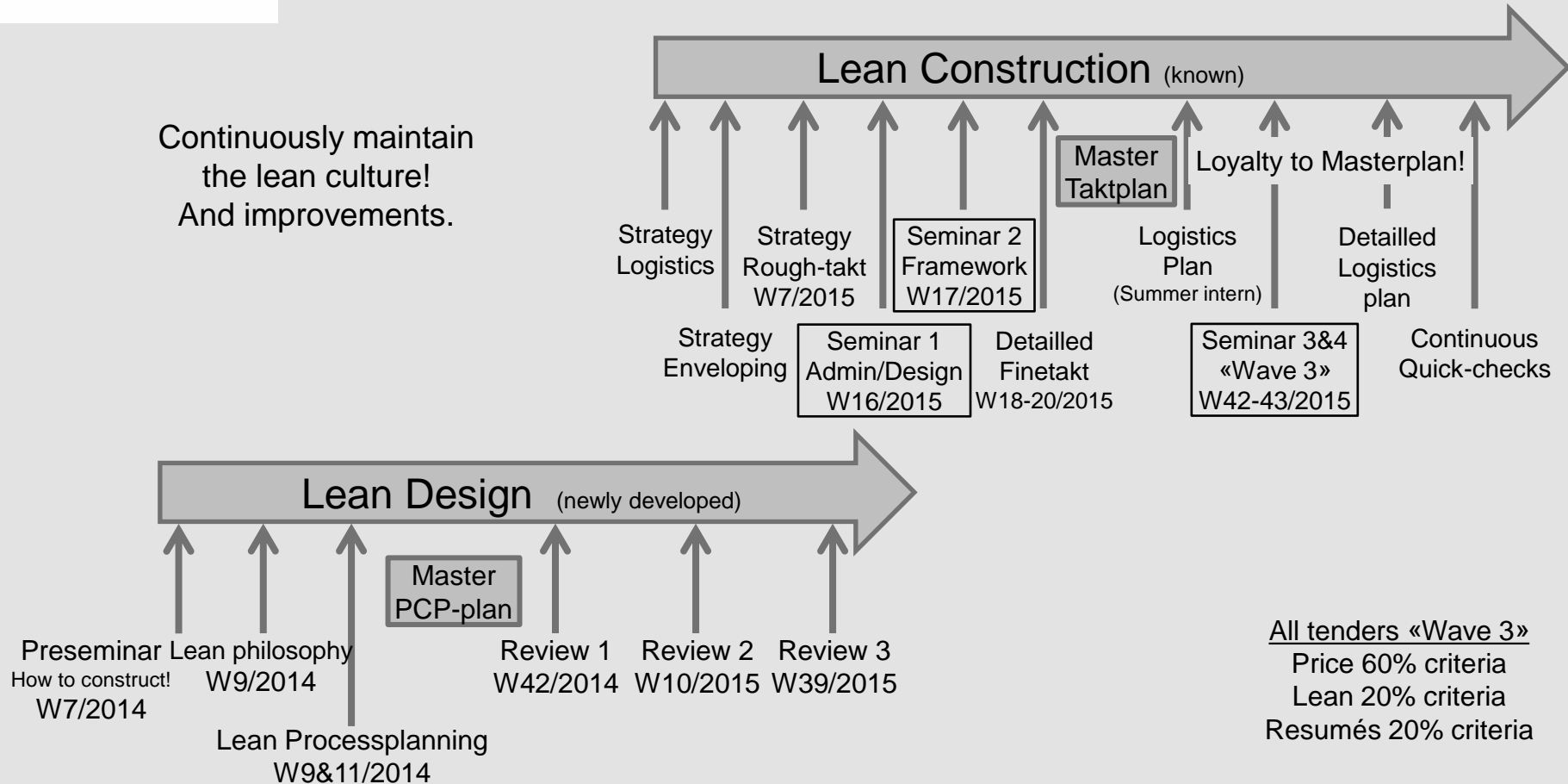
OWNER - CLIENT	Statsbygg
ARCHITECTS	Snøhetta
DESIGNING ENGINEERS	Ramböll
LEAN CONSULTANTS	Porsche Consulting

KHIB LEAN STRATEGY (2013-2016)

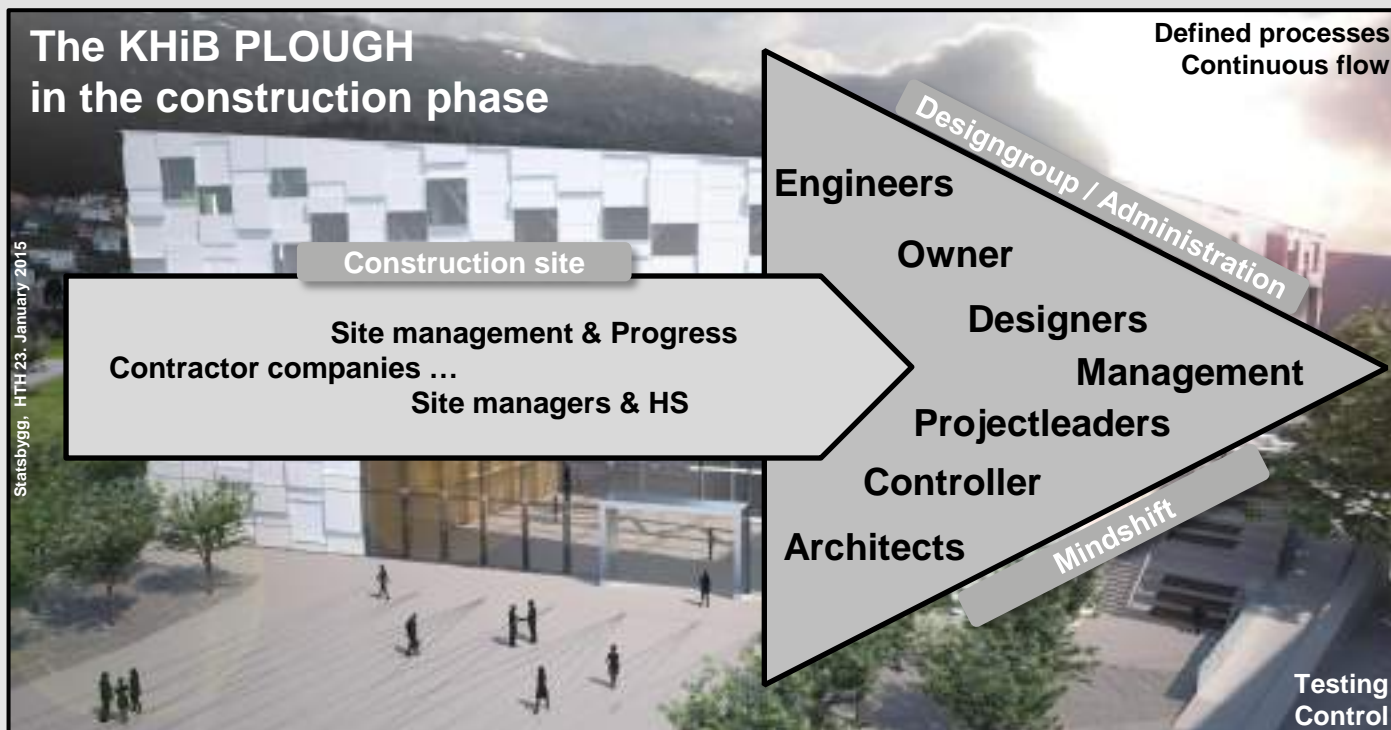
- **LEAN Culture and mentality**
 - Creating and maintaining a strong lean culture – together / The Plough
 - Flow-efficiency vs. Resource-efficiency: Flow priority
- **LEAN Process-management**
 - Define, plan, think and manage in terms of processes
 - Continuous work-process improvements
- **LEAN Design**
 - Slicing huge undefined pieces into small manageable elements
 - Visual planning and complete transparency
 - Regular value adding into the BiM
- **LEAN Construction and Logistics**
 - Detailed planning / Takt-areas / Standard one-trade-sequences
 - Just-in-time deliveries
- **Tools: BiM and dRofus** (a room-function-database)

KHIB LEAN STRATEGY (2013-2016)

Continuously maintain
the lean culture!
And improvements.



KHIB MENTALITY



KHIB PROCESS-MANAGEMENT

A 2 week-seminar with Porsche Consulting



PCP-map: Product Creation Process

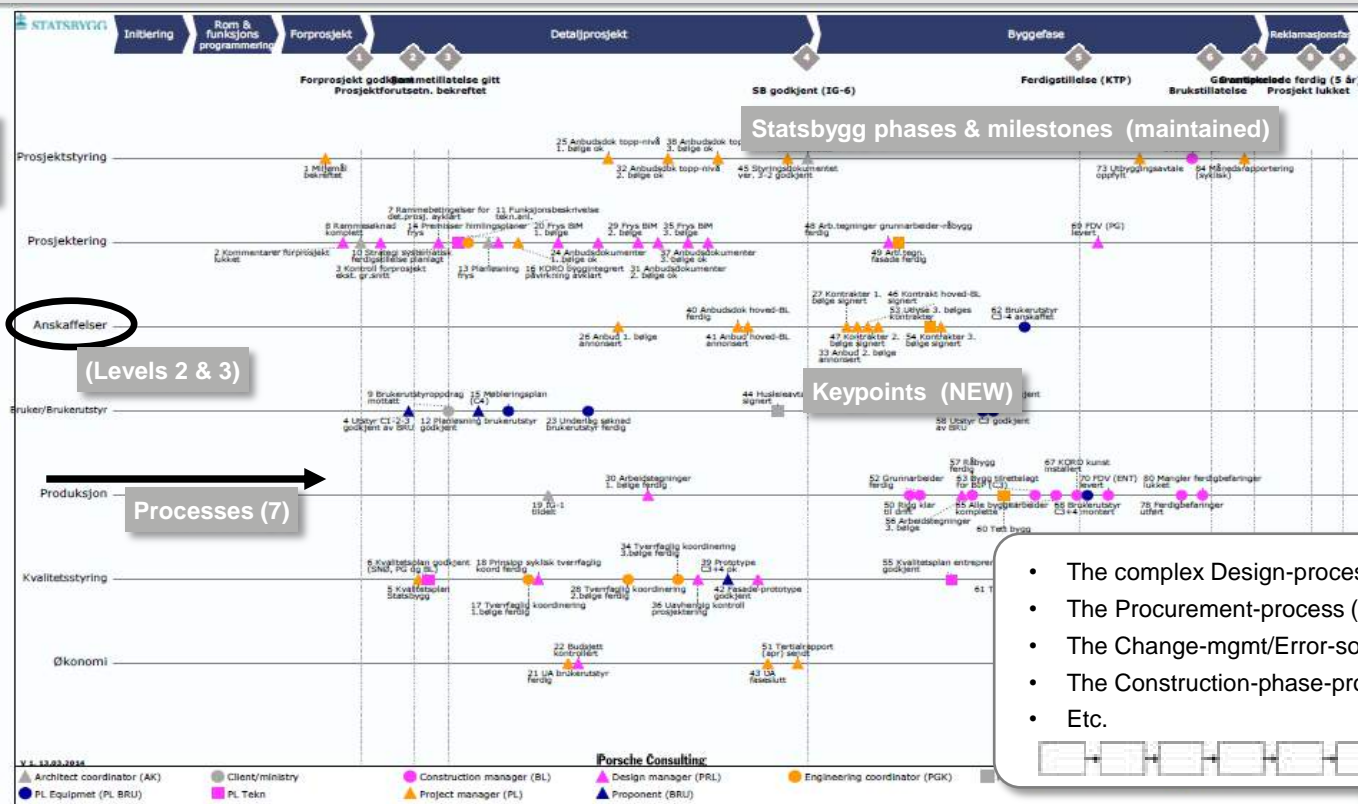


CREATING an OVERALL (STANDARD) PROCESS PLAN

- Level 1 process management level
- Dependencies & transparency

KHIB PROCESS-MANAGEMENT

«Level 1»
Processes



(PRINCE 2 principals)

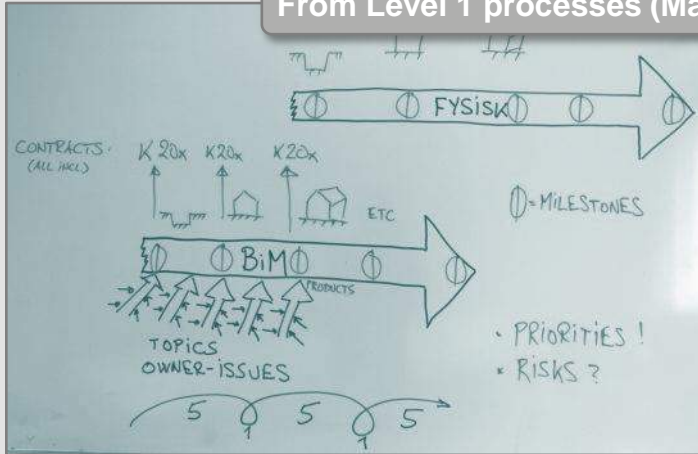
- The complex Design-process (KHIB P2)
- The Procurement-process (KHIB P3)
- The Change-mgmt/Error-solution process
- The Construction-phase-processes (KHIB P5)
- Etc.



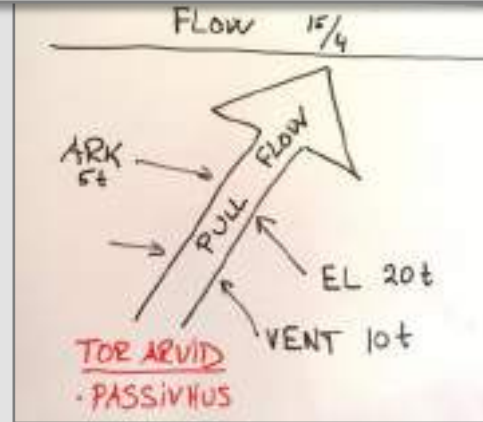
Source: Porsche Consulting

KHIB LEAN DESIGN

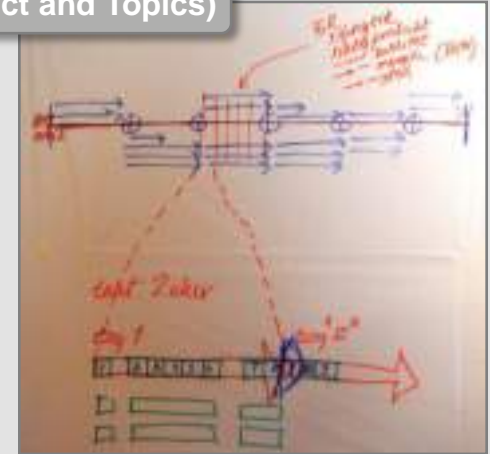
From Level 1 processes (Management) to Level 2 and 3 (Product and Topics)



Logical flow, virtually and physically



Indicate resources, time & input
Each topic/issue has 1 owner
Output deadline

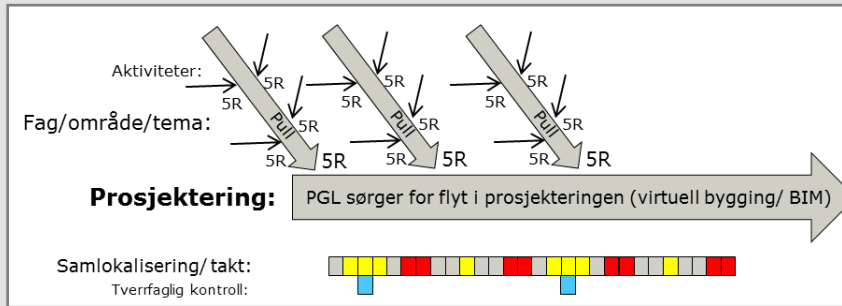


Topic/issue duration varies
(SCRUM principals)

KHIB LEAN DESIGN

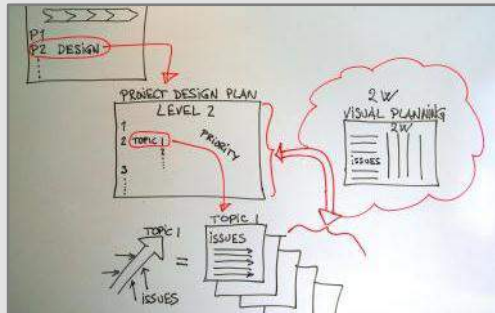
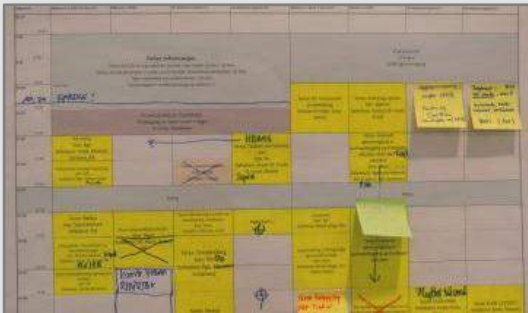
Deloppgaver «Tema» (eksempler fra KHIB):

T1 Bygningsfysikk
 T2 Akustikk
 T3 Miljø
 T4 Brann
 T5 Geoteknikk
 T6 Systematisk ferdigstillelse
 T7 Dagslys kunstbelysning
 T9 Fundamentering-råbygg
 T10 Fasade - tett bygg
 T11 Landskap
 T12 VA, Utendørs vann og avløp
 T13 Teknisk infrastruktur EL, automatikk
 T14 Tekniske rom, ventilasjon, sprinkling
 T15 Planløsning - layout
 T17 Materialer - Overflater - ARK himling
 T18 Himling og belysning plan 1 Verksteder
 T19 Takplan slukplassering og utforming av renner
 T20 Sluk og slukrenner plan 1
 T22 Prosjekthallen
 T23 Målestruktur
 T24 Krav til våtrom



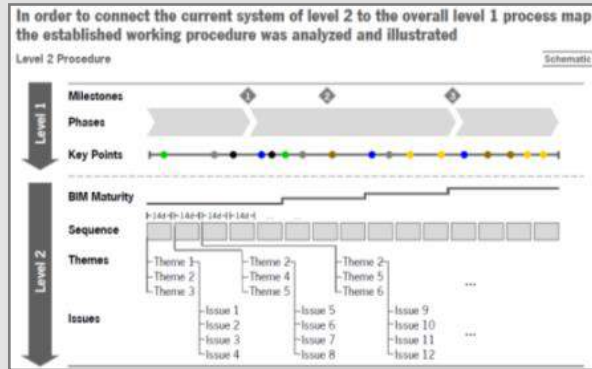
- Topics (tema) in logical order
- Design flow
- BiM Crash-controls
- Logging (substituting minutes)

KHIB LEAN DESIGN

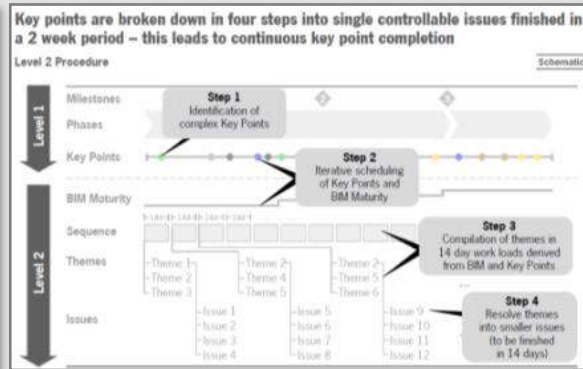


- Visual planning
- Big-room-sessions
- Transparency
- Booking-list
- Combining Levels 1, 2 and 3

KHIB LEAN DESIGN

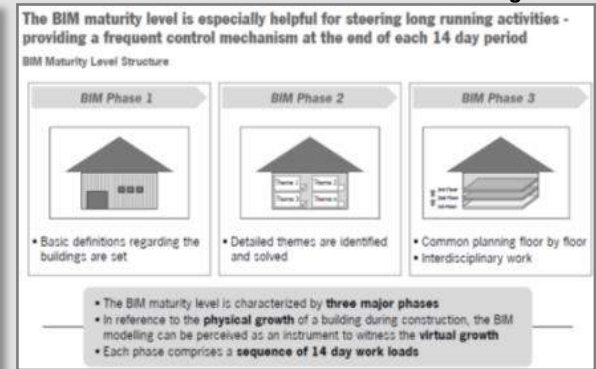


Increasing BiM-«maturity»



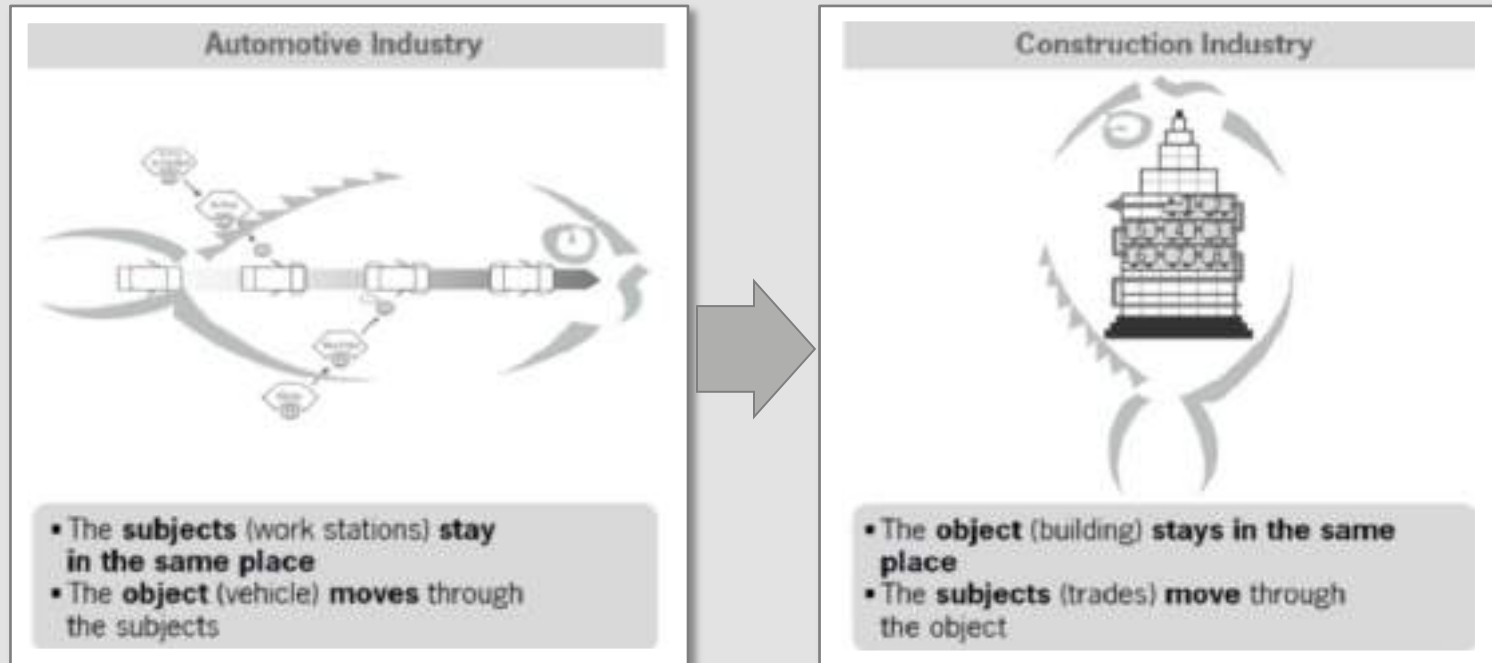
2 week takt / 3-day co-location

Source: Porsche Consulting / KHiB



BiM-LEAN synergy effects

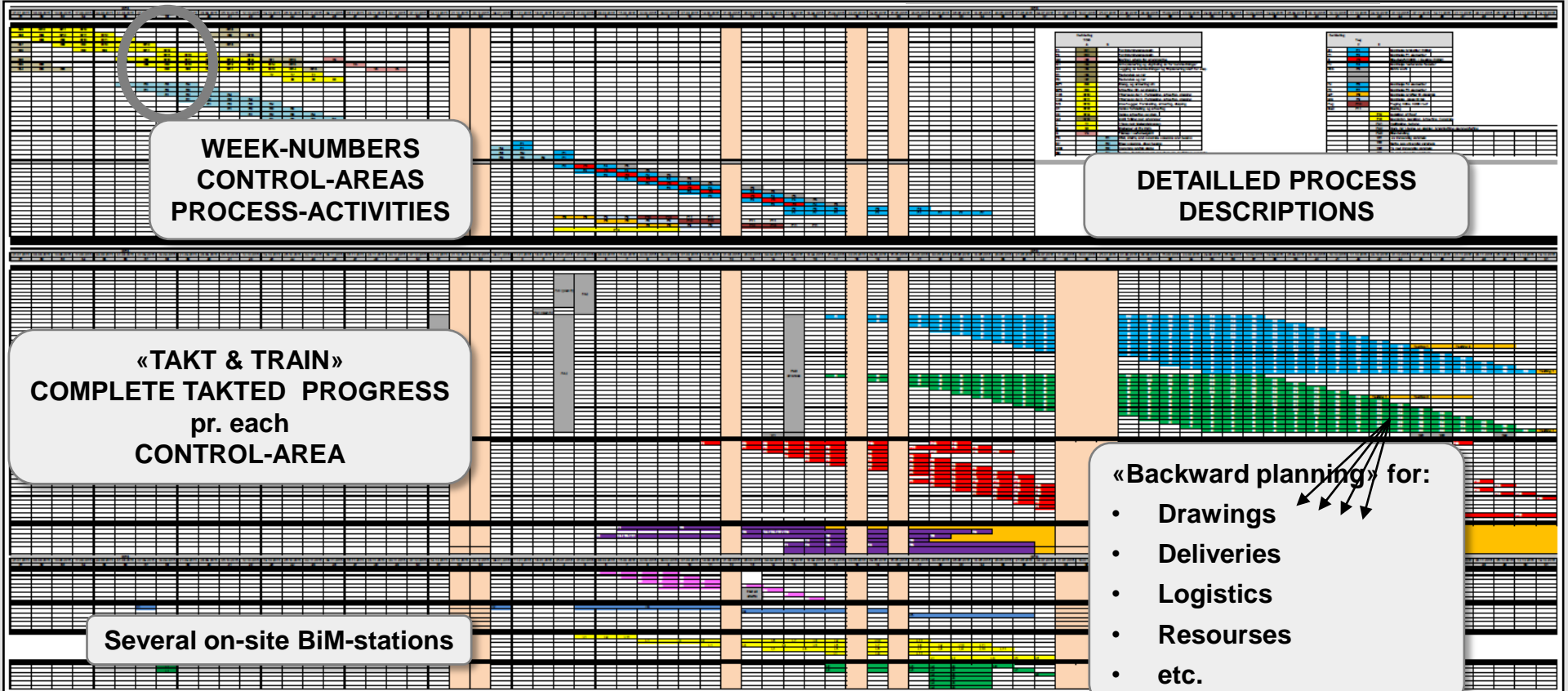
KHIB LEAN CONSTRUCTION



Source: Porsche Consulting

KHIB LEAN CONSTRUCTION

DETAILED TAKT



WEEK-NUMBERS
CONTROL-AREAS
PROCESS-ACTIVITIES

DETAILED PROCESS
DESCRIPTIONS

«TAKT & TRAIN»
COMPLETE TAKTED PROGRESS
pr. each
CONTROL-AREA

Several on-site BiM-stations

«Backward planning» for:

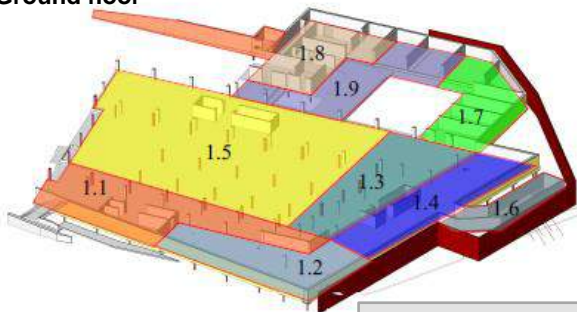
- Drawings
- Deliveries
- Logistics
- Resources
- etc.

KHIB LEAN CONSTRUCTION

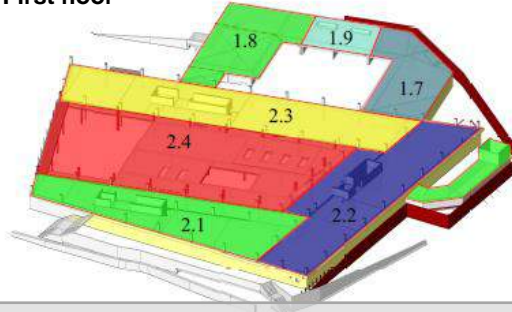
		Date	31.08.2015	07.09.2015	14.09.2015	21.09.2015
		Calendar week	36	37	38	39
Plan	1.1					
	1.2					
	1.3		IS12			
	1.4		IS11	IS12		
	1.5		IS10	IS11	IS12	
Kulvert	1.6				IS11	IS13
VG	1.7		IS8	IS9	IS10	IS11
VG	1.8			IS8	IS9	IS10
VG	1.9				IS8	IS9
Trapp						
Støttemur						
Plan	2.1		R1	R2	R3	R4
	2.2			R1	R2	R3
	2.3				R1	R2
	2.4					R1

IS8	Steng, og armering UK		
IS9	Armering OK og støping		
IS10	Yttervegg del 1, Forskaling, armering, støping		
IS11	Yttervegg del 2, Forskaling, armering, støping		
IS12	Innervegger, Forskaling, armering, støping		
	Dekke forskaling og armering		
IS14	Dekke armering og støp		
IS15	Inntil fylling mot grunnmur		
Tr	Trapp mot Mølandtsveien		
St	Støttemur ut fra trafo		
Vk	Påstøp i verkstedgård		
	R1	Wall, stairs, and concrete columns and beams	
	R2	Steel columns, steel beams	
	R3	Concrete prefab slabs	
	R4	Fuging, Reinforcement and Screeds of 150mm concrete	

Ground floor



First floor

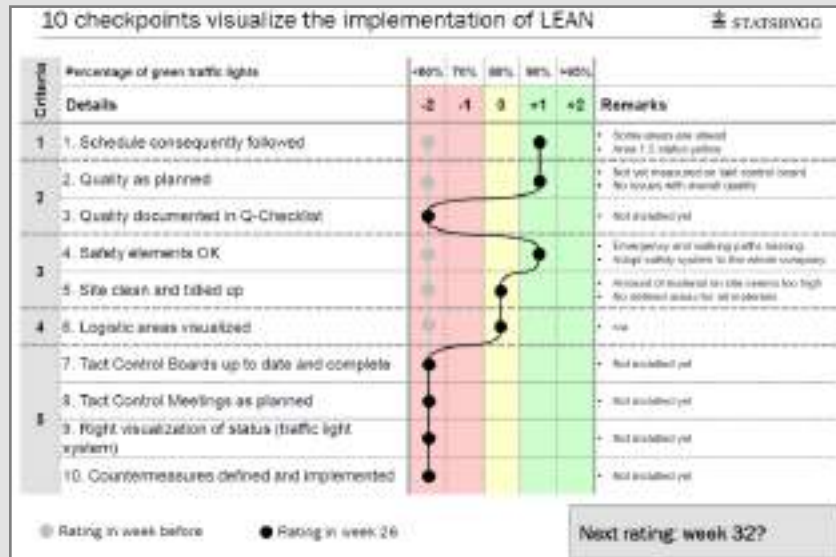


WEBCAM:

- <http://356112040417100.eairlink.com/cgi-bin/viewer/video.jpg>
- <http://356112040417191.eairlink.com/cgi-bin/viewer/video.jpg>

(root / adminbet)

KHIB LEAN QUICK-CHECK



Source: Porsche Consulting

KHIB LEAN EXPERIENCES

- Nothing is so complex as creating an easy system
-
- Management must go “all in” (top down) and continuously nourish the lean culture
 - Gravity towards traditional mentality is extremely strong
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- High focus on construction site issues during design-phase and phase-transitions
 - Constant focus on defining whether issues are single- or cross-functional
 - Planning must start extremely early
 - Planning to an extremely detailed level
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- As far as possible standardize construction processes (thus creating highest degree of predictability)
 - The master taktplan is the heart of the project
 - Detailed finetakting gives a broad range of advantages

Questions ?

Thank for your attention

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