The Quality Assurance Act for construction in the building process

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Construction Management & Engineering

July 11, 2016

VAN WIJNEN
Meer dan bouwen

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Where innovation starts

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Introduction

Niet afwachten, maar proactief aan de slag gaan. Dat is hoe Van Wijnen Deventer B.V. omgaat met de naderende invoering van de Wet Kwaliteitsborging. Het bouwbedrijf draait een aantal pilots om ervaring op te doen met de toekomstige regelgeving.

Voor bouwbedrijf Van Wijnen is het niet meer dan logisch om nu al 'live te gaan', vertelt projectleider Wilbert Hilverda. "De Wet Kwaliteitsborging is een verlengstuk van waar Van Wijnen altijd al naar streeft, namelijk een optimale kwaliteit voor de klant. We willen niet wachten tot het moment daar is, maar klaar zijn als het zover is. Ons doel is om uiteindelijk met zo min mogelijk inspanning en zoveel mogelijk plezier de kwaliteit te kunnen borgen en verbeteren."

Extra ogen

Eén van de pilotprojecten is het, inmiddels opgeleverde, woningproject Landsherenkwartier in Deventer. "We zijn hier met kwaliteitsborging omgegaan zoals het straks ook zal gaan, met gBOU. als externe partij die de controle doet en ED Controls als instrument voor kwaliteitsborging", vertelt Hilverda. Al in een vroeg stadium zat Van Wijnen samen met adviesbureau voor bouwkwaliteit gBOU. en ED Controls aan tafel om het proces zo goed mogelijk vorm te geven. "gBOU. heeft maar één doel voor ogen en dat is de kwaliteit bewaken. Het zijn extra ogen op de bouwplaats. Dat is prettig voor de uitvoerder maar ook voor de klant. Die heeft meer zekerheid dat hij krijgt wat is overeengekomen."

Digitale tool

De belangrijkste les uit de pilots: zorg ervoor dat je kwaliteitsborging meteen zo optimaal mogelijk inricht. "Blijf bewust van waar je mee bezig bent en doe het vanaf het begin goed. ED Controls is voor ons de juiste keuze gebleken om kwaliteitsborging vorm te geven. Deze digitale tool kan heel goed ingezet worden om zaken vast te leggen, te communiceren en snel te anticiperen op veranderingen. Consequent hiermee werken geeft rust in het proces."

Hilverda ziet de toekomstige regelgeving niet als bedreiging, maar als kans. "Door bewuster bezig zijn met kwaliteit kom je tot een beter product en een proces dat op een hoger niveau ligt. Dit leidt uiteindelijk tot reductie van de zo bekende faalkosten. En een tevreden klant komt altijd bij je terug."

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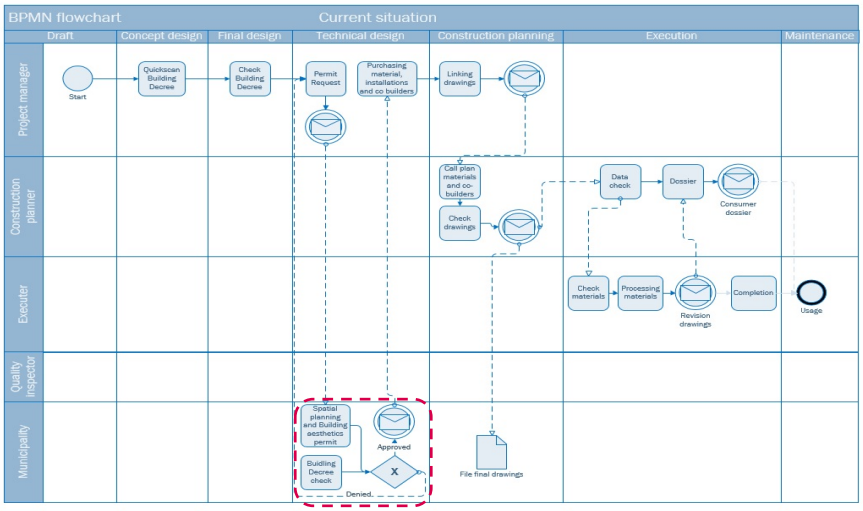
ed controls
gBOU.

Current situation



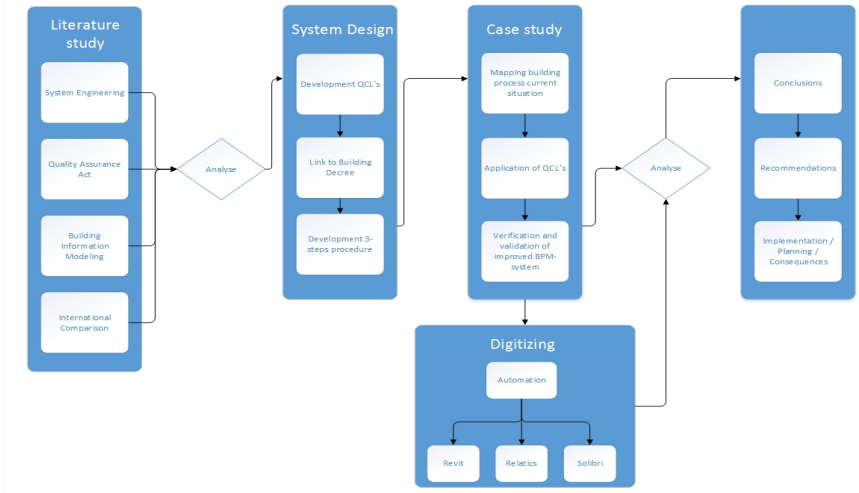
Problem definition

- Law
  - Influence on construction process
  - Effective and efficient
- What is needed?
- Important changes
  - Municipality does not longer check construction plans according to the Building Decree
  - In stead of checks up front, now as-built statement

Research question

Is it possible with systems engineering (SE) and Building Information Modeling (BIM) to efficiently deliver an as-built statement which the independent quality inspector can present to the building permit holder under the Quality Assurance Act for construction (Wkb)?

Research model



Quality Assurance Act (Wkb)

- Starting point
- Cause of the new law
  - VROM
- Three parts:
  - The amendments to the Environmental Licensing (General provisions) Act (WABO)
  - The Housing Act (WW)
  - The Civil Code (BW)

International Comparison

Table 1: Summary analyzed systems

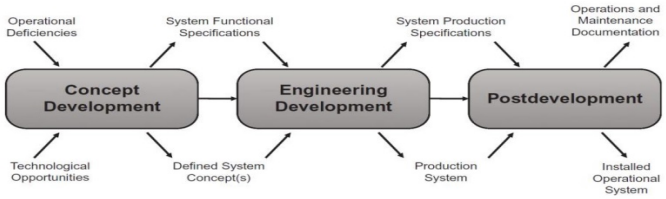
Activities	Germany	England	France	Sweden	Netherlands[3]
Design Check	◔	[1] ● ○	●	●	●
Construction Check	◔	[1] ● ○	●	●	●
Permit to use	○	○	[2] ○	○	[4] ◔
Supervision plan	-	-	●	●	●
Supervision plan check and permit	-	-	○	◔	-
Qualifications designers and contractors	●	●	◔	◔	-
Qualifications check systems	-	-	-	-	◔

Legend	
●	Private
◔	Mix
○	Public

Remarks:
[1]: Choice between private or public inspection
[2]: Only high-rise and public buildings
[3]: New system (Wkb)
[4]: Obliged as-built statement

Systems Engineering

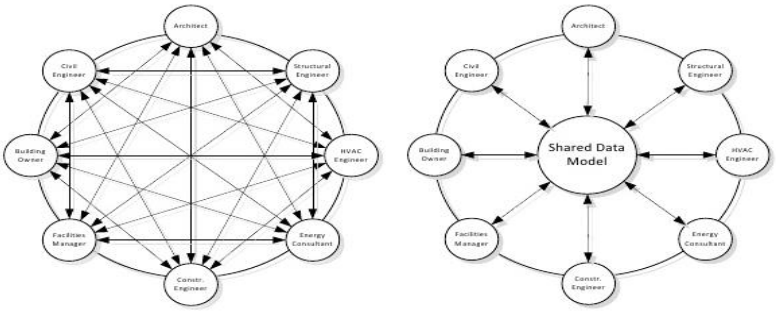
- **Structured specification and design method**
- **Not common in housing**
- **Focus on the consumer**
- **Verification Validation**



Source: (Kossiakoff, Sweet, Seymour, & Biemer, 2011)

Building Information Modeling

- Digital support in design and execution phase
- Goal is to improve the communication between involved parties
- In development (not complete yet at construction company)

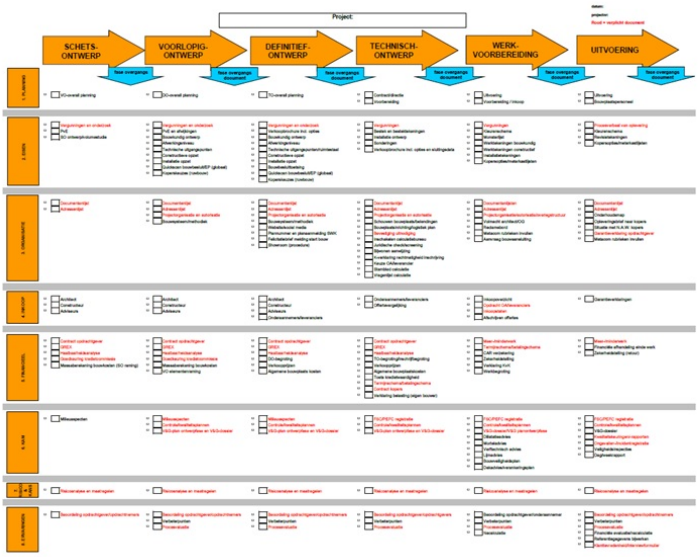


Source: (Beetz, Berlo, Bos, Hendriks, & van Tongeren, 2012)

System Design

- Goal:
  - Fit in the current building process management system at Van Wijnen
  - Connect to the instrument of SWK
- Design
  - 3 steps:
    - Step 1: BPM matrix
    - Step 2: QCL
    - Step 3: CP

Building Process Management System



Step 1: BPM matrix

	1 - DRAFT	2 - CONCEPT DESIGN	3 - FINAL DESIGN	4 - TECHNICAL DESIGN	5 - CONSTRUCTION PLANNING	6 - EXECUTION	7 - MAINTENANCE
1 PLANNING							
2 REQUIREMENTS							
3 ORGANIZATION							
4 PROCUREMENT							
5 FINANCIAL							
6 KAM							
7 RISKS AND OPPORTUNITIES							
8 EXPERIENCES							

Step 2: Quality Checklists

- Related to the Building Decree

QCL 301: Façade locks (windows frames)								
N.	Phase	Building Decree article	Component	What	How / Norm	Who	With what	When
5	4	2.2 /2.4	Calculation lintels (supplier)	Requirements: Do not collapse	NEN-EN 1990 & 1992-1996	Constructive assessor	Check calculation	
6	5	5.3	Thermal transmittance (U-window)	Requirements: U_{cw} : ≤1,65 (c.q. requirement EPC) W/m2K and Cf BRL 0801	NEN 1068/ KV + delivery receipt	Work planner (constructor)	CP 303	
7	5	5.3	Manufacturing window frames & doors	Cf BRL 0801	KV + delivery receipt	Work planner (constructor)	CP 303 + 304	

Step 3: Control Protocols

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Van Wijnen Deventer
Project :
:
Location :

CP303 Synthetic windows frames

Projectnumber :
Drafter :
Date :

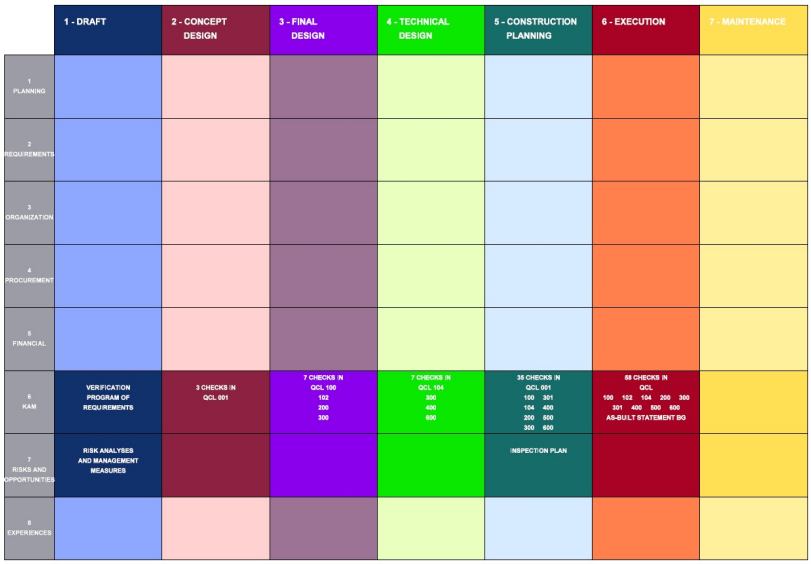
Component	Approval			Clarification/action	Handled
General (phase 4)	Y	N	N/A		
KOMO-certificate present					
Is the 'politiekeurmerk' applicable					
Construction planning (phase 5)					
Preparing and monitoring drawing procedures					
Sampling hinges and locks i.c.w. assembly by manufacturer					
Protecting windows during execution phase					
Planning en routing discussed					
Making and checking windows frames					
Dpc foil applied on windows frames					
Measuring syntactic window frames					
Execution (phase 6)					
Supply check windows frames					

Result

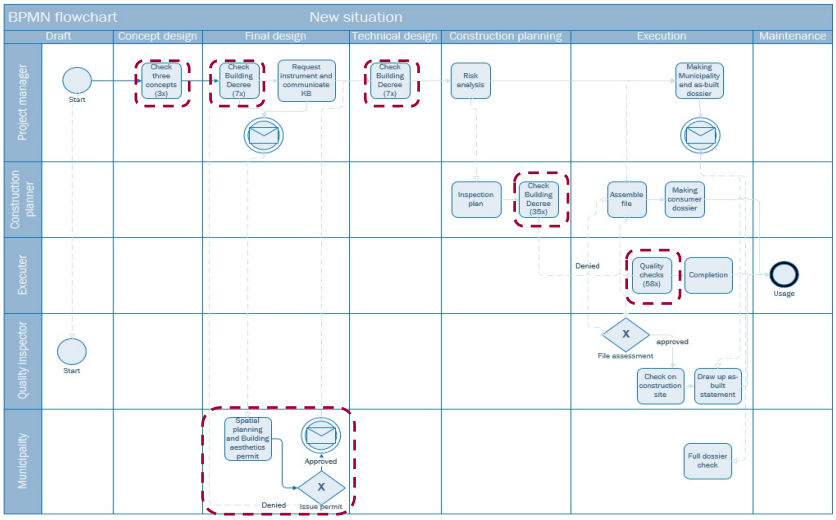
- 10 Quality Checklists
- In total 110 checks during the building process

QCL	SO	VO	DO	TO	Construction Planning	Execution
000		3			1	
100			1		1	5
102			1			6
104				1	2	3
200			3		2	5
300					6	4
301			2	2	5	5
400				1	9	5 (+2)[4]
500					7	15
600				3	2	10
TOT	**0**	**3**	**7**	**7**	**35**	**58**

Result



New Situation



Case study

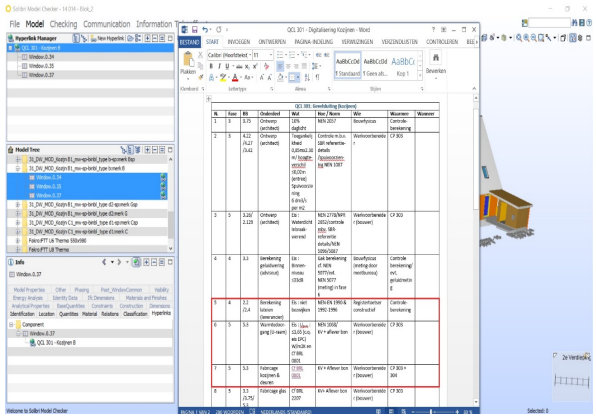
- **Groevenbeek**
  - **Current situation**
    - **Proper risk analysis**
    - **Not everything was recorded**
    - **Connection with Building Decree not clear**
    - **As-built statement?**

Digitizing

- Tools
  - Solibri
  - Revit
  - Relatics
- Automation

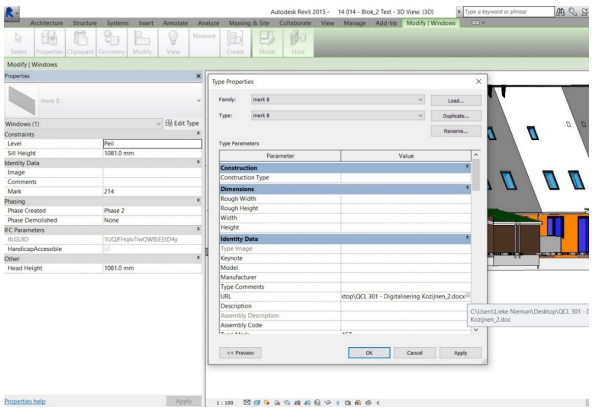
Solibri

- Model checker:
  - Easy to link and check the drawings with a QCL



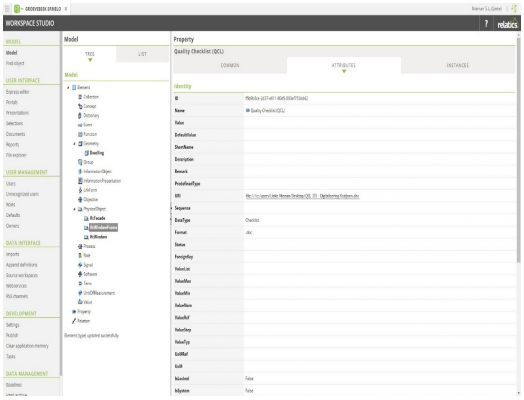
Revit

- 3D drawing software
- Plugin



Relatics

- Cloud platform to control all information within a project
  - A bit cumbersome because not full access to the platform



QCL linked to CP

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Execution (phase 6)					

Conclusion

Systems Engineering in conjunction with a BIM-system is a prerequisite to efficiently and effectively deliver the by the Wkb required as-built statement. The developed quality assurance system can theoretically be used without digital support. The costs (time spent) will be high with the risk that checks will be omitted, in which case the independent KB needs to spend extra time (costs).

Risks

- Decrease in innovations
- Higher costs
- Bureaucracy

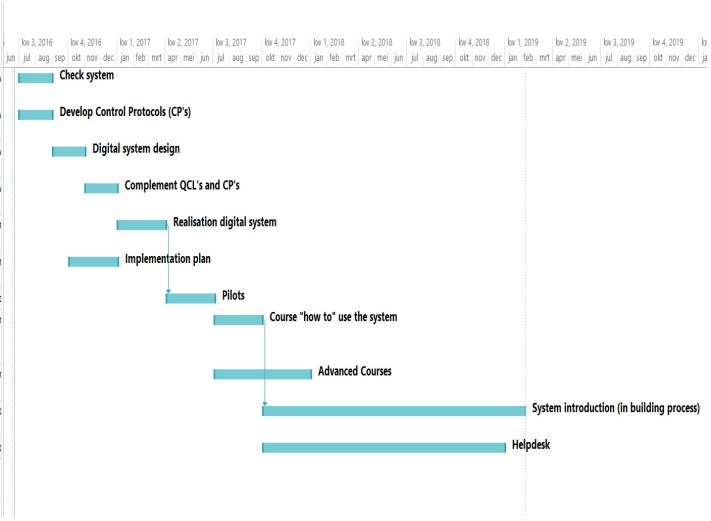
Recommendations

- The application of SE would connect very well to effectively and efficiently secure quality for the new quality assurance law
- Relatics
- Automation is important
- Prevent bureaucracy
- Pay attention to the creation of support
- Take your time for implementation, but start today

Planning for implementation

GANTT DIAGRAM

	Taaknaam	Duur
1	Check system	45 dagen
2	Develop Control	45 dagen
3	Digital system design	44 dagen
4	Complement QCL's and CP's	44 dagen
5	Realisation digital system	66 dagen
6	Implementation plan	67 dagen
7	Pilots	66 dagen
8	Course "how to" use the system	66 dagen
9	Advanced Courses	131 dagen
10	System introduction (in	354 dagen
11	Helpdesk	326 dagen



The new system is a step towards a more modern industry which produces sustainable, healthy, useable and safe buildings for its customers. An industry that produces flawless, listens to its customers and where 'you' would like to work with

Questions