Pre-fab SB
Le Gabion

Managing and Preparing pre-fab SB projects

SBN
strobouw nederland

To my great pleasure
full time eco builder

Formula

- Open schedule
- Building team

- Pushing the envelope
- SB excellent free marketing
- re-grow-able materials
- More comfort at the same price

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decompressor
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Who am I ?

René Dalmeijer rene.dalmeijer@hetnet.nl

- SB builder
- SBN Chairman

Background

- HTS Building engineering, building physics
- Prego 1984 Kristinson
- 20 years IT/Process consultancy
- 1998 1st ESBBC, Bretagne
- Now since June 2005 SB eco/builder

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Sustainable building

- Integrated<>Piece meal
- 3x sustainable
  - regrowable materials
  - low energy consumption
  - Long useful life
- Mission: Generate acceptance

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State of the art Straw bale, IJburg

- High insulation R > 6
- Pleasant atmosphere
- Competitive price

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Features IJburg 1

As much as possible renewable resources

- Straw
- Earth inner plaster
- Wood (pine)
- Sapipura FSC window frames
- Hydraulic lime exterior plaster
- Green roof, without metal trim
- No piles

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State of the art Straw bale, IJburg

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State of the art Straw bale, IJburg

Natural hydraulic LPM-10
Works very well
Very expensive €1.25/kg
€15000,- for 135m^2 exterior plaster

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State of the art Straw bale, IJburg

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Radiant floor heating

Paraffine impregnated pellets
27C phase change

Original plan:
heat pump

Now:
council heating

Too complex and experimental for owner

Earth plaster workshops

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16 participants total

more workshops to come

2 customers !

State of the art Straw bale, IJburg

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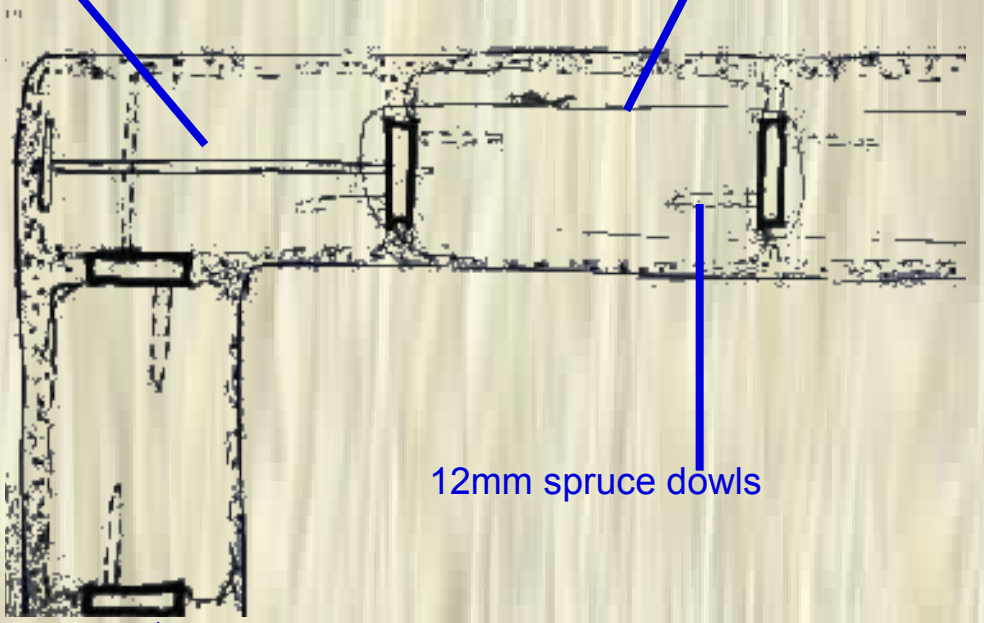
Hand applied earth plaster
Costed at €35/m^2
incl Jenné ‘Alis’

State of the art Straw bale, IJburg



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IJburg 2

5 story
pre-fab SB

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Features IJburg 2

Pre-fab 5 story straw bale
‘Wood Frame with thermal mass’

- Pre-fab straw bale elements
- High insulation exterior walls Rc>5
- Thermal mass 15-20 ton earth plaster
- Heat pump fed low temperature radiant heating
- Pre-fab elements (pine)
- Window frames (pine)
- Larch exterior cladding
- ‘Massive’ Steel portal frames

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IJburg 2

Preparations at the factory

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IJburg 2

The first pre-fab SB element

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IJburg 2

Day 1 sorting

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IJburg 2

Day 2

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IJburg 2

Day 3 erection

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IJburg 2

Day 5 erection

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IJburg 2

Day 11 finish build

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Advantages IJburg 2

- substantially lower €/m^2
- faster finish < 2 months

Evolution:

- eliminate steel portal frames

Challenges:

- Even faster finish
- Lighter construction
- Even less concrete in foundation and floor

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Preparing pre-fab building projects

Requires rigid configuration management during whc

Why?

Many pressures to stray off course

- New requirements
- Miscommunication
- Short cuts

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Configuration management

Manage expectations

Quality according to CMII

> ‘Supply what the customer expects’

Involve all parties

Explicit specifications

Communicate, communicate, communicate...

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Configuration management

Tools:

- Patterns
- Front loading
- QFD

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Patterns

Method to maintain consistency during project

Natural Patterns

Develop own patterns for project

A Pattern Language, Christopher Alexander

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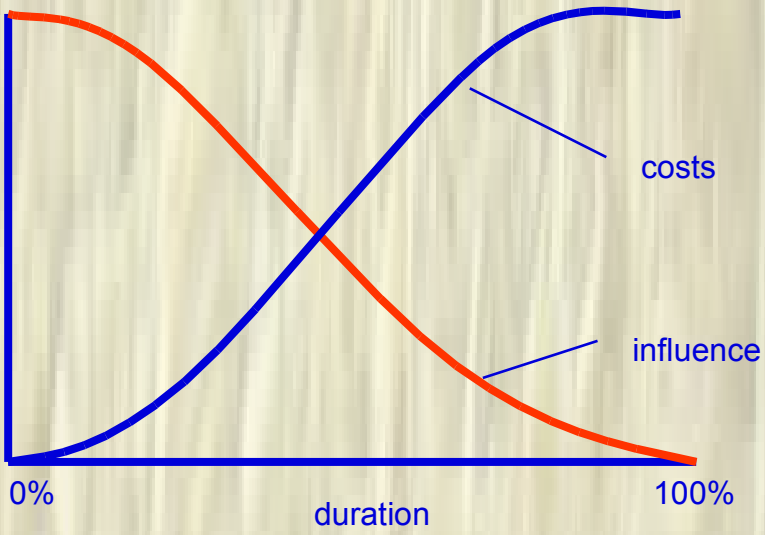
Front loading



System engineering

integrated approach <> reductionist

materials with multiple functions

The 5th discipline, Peter Senge

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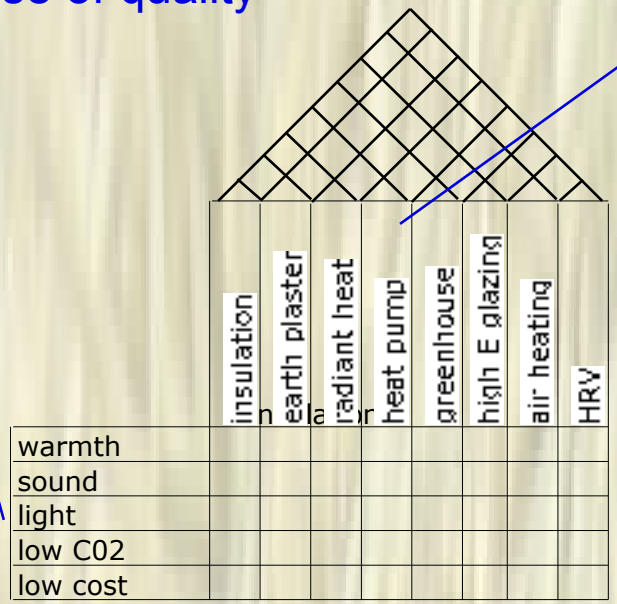
QFD quality function deployment

separate the what's from the how's

select the right how's

House of quality



Step-by-step QFD, John Terninko

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The whole Procedure

1. Define Patterns
2. Determine Functions
3. Preliminary design
4. Green ambition, define what's
5. Choose how's
6. Select partners
7. Definite design
8. Detail design at component level
9. Design build procedure
10. Plan build
11. Execute build
12. Evaluate project

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Technical Specification

Preamble:

- expressed in Patterns
- States ambition

Technical specs:

- As specific as possible
- How and why

This document is not static and should evolve during the projec

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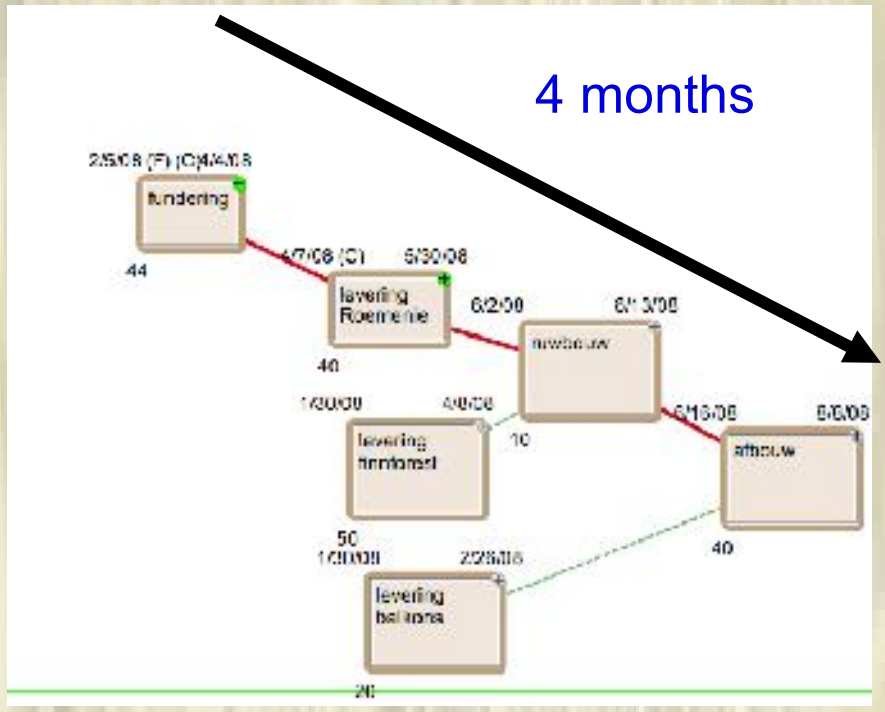
Plan



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Plan

2 months waiting for components

2 months actual build

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Evaluate

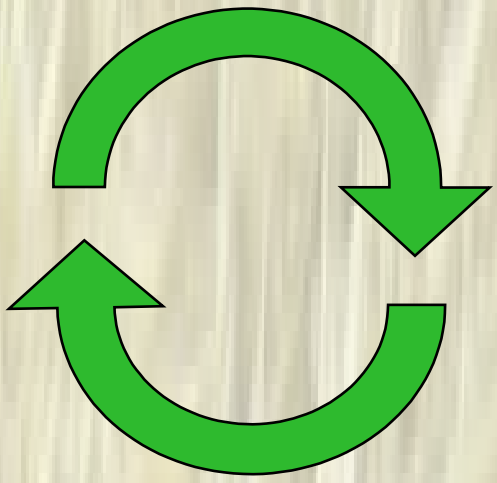
Lessons learned

The best way to learn is from mistakes

Logistics is essential
- Last two trucks mixed

Every component explicit
- Balanced ventilation system

First time right
- EPDM roof cover leak



No steel frames

We will make new mistakes

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IJburg 3

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Specs IJburg 3

Pre-fab 5 story SB
‘Passief wood frame with thermal mass’

- Pre-fab ‘Passiefhaus’ elements
- Exterior walls Rc>5
- Thermal mass 15-20 ton earth plaster
- Heat pump LT 20C radiant wall/floor heating
- Pre-fab elements and windows (pine)
- PVC free plumbing
- Larch cladding
- Full wood structure

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IJburg 3

My birthday on the groundfloor

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IJburg 3

Build day 1

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IJburg 3

Build day 5

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IJburg 3

Build day 7

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IJburg 3

‘Passiefhaus’ window details

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IJburg 3

SB entry 2 day weekend workshop

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IJburg 3

Tadelact in the bathroom

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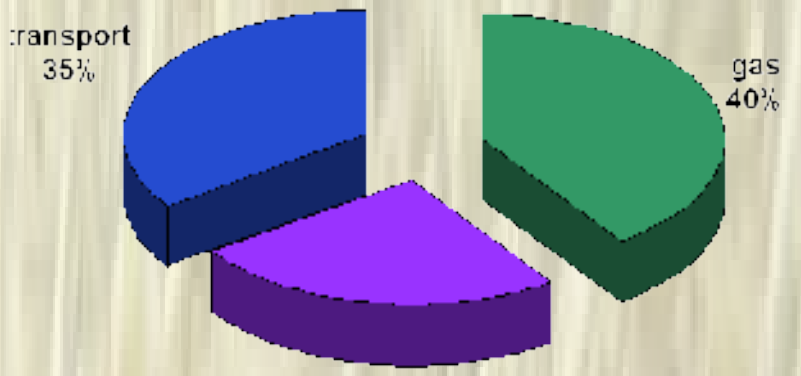
CO2 savings with straw bales

- 100m2 straw bale exterior wall
- Wood frame, plaster (not earthen)
- Other structures conventional

18 ton savings

- Depending on choices even more is possible



Bron adviesbureau AGM

18 ton =  = 2,5 year average household consumption

Bron CBS

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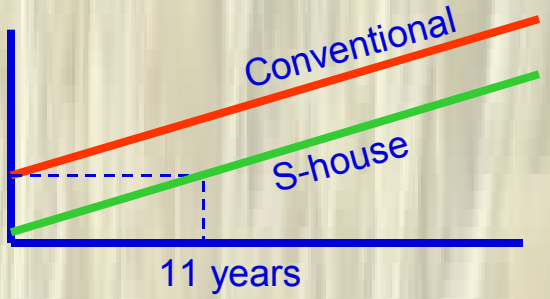
S- House, GrAT TU Wien

S- House

- 0 energy ‘Passiefhaus’
- extreme Nawaro



The lower energy use,

The greater impact building energy has on LCA

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How can you contribute?

Join forces

We need the support of academia

We need to do research to support the wide scale introduction of re-growable building materials

Do practical projects instead of creating paper tigers

Self regulation (European) and ETA is the path for high volume

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SBN, Strobouw Nederland

- Central information point for straw bale building in The Netherlands
- Advice
- Central library
- Platform for straw bale designers, consultants and builders

www.strobouw.nl

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Formula

- Open schedule
- Building team

Sustainable builder, consultant

René Dalmeijer

rene.dalmeijer@hetnet.nl

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Style concept low tech

Wageningen

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Wageningen

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SB basics

Boots

ladder frame, > 200 toe up outside > 30 toe up inside

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SB basics

Drainage:
Gravel,
Mussel shells,
Perlite,
Pumice

NO barriers!

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SB basics

Pinning systems for load bearing:
Central, external, straps, mesh, none

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SB basics

Rain covers:
Non load bearing > Roof, Load bearing > covers

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SB basics

Knots for:
Custom bales
Tying external pins
Corners

Straps:
Compressing bales
Keeping posts straight
Cross bracing

All thread:
Tucking in corners
Around big windows

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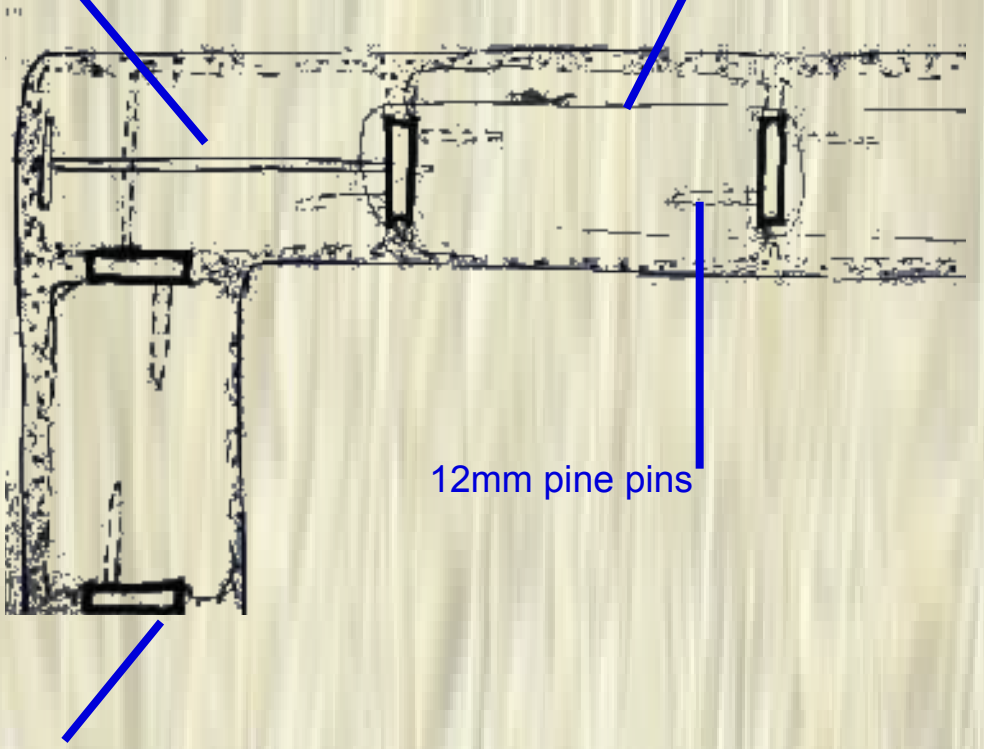
SB basics



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