

Implementing Lean practices in Design & Construction



Dag Sander, Process Development Manager
MT Højgaard, Business Development

TrimBuild®

- Process Management

Summary:

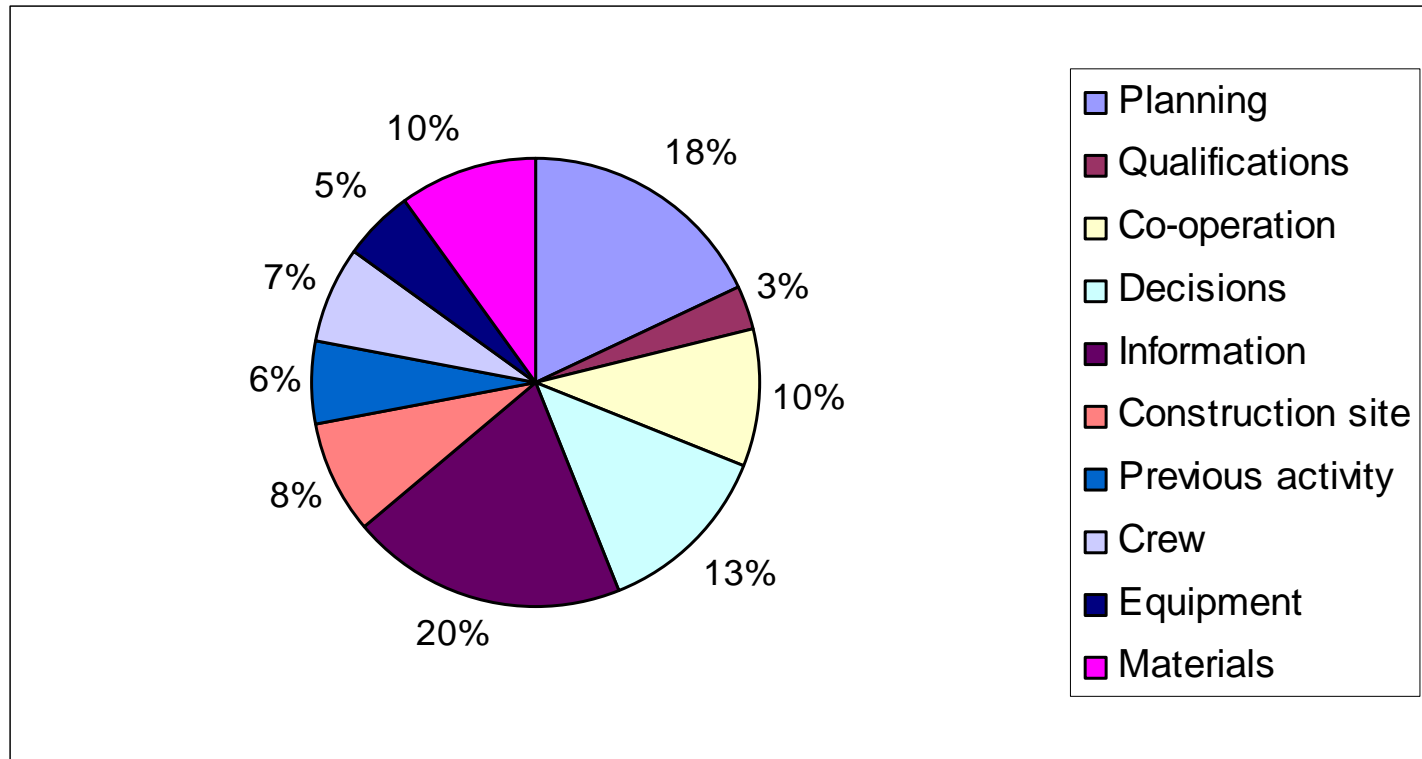
- Background
- Implementing TrimBuild®
- The Danish model
- Questions and comments

MT Højgaard in brief

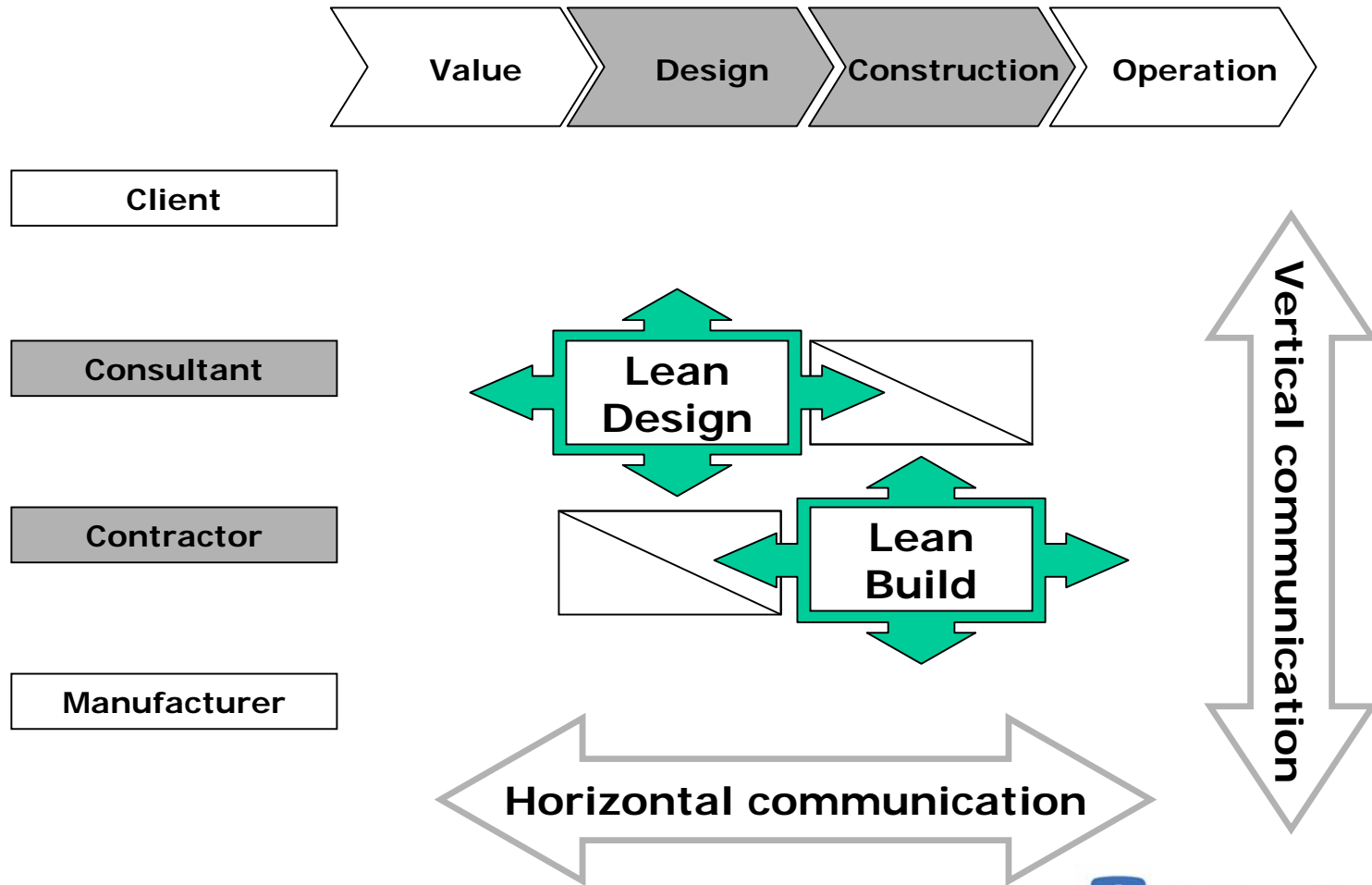
Denmark's largest contracting company:

- Production turnover in 2004: 1 billion USD
- Number of employees: 5500
- 10 per cent market share in Denmark
- Business areas:
 - **Building**
 - Civil Engineering
 - Installation
 - International / steel

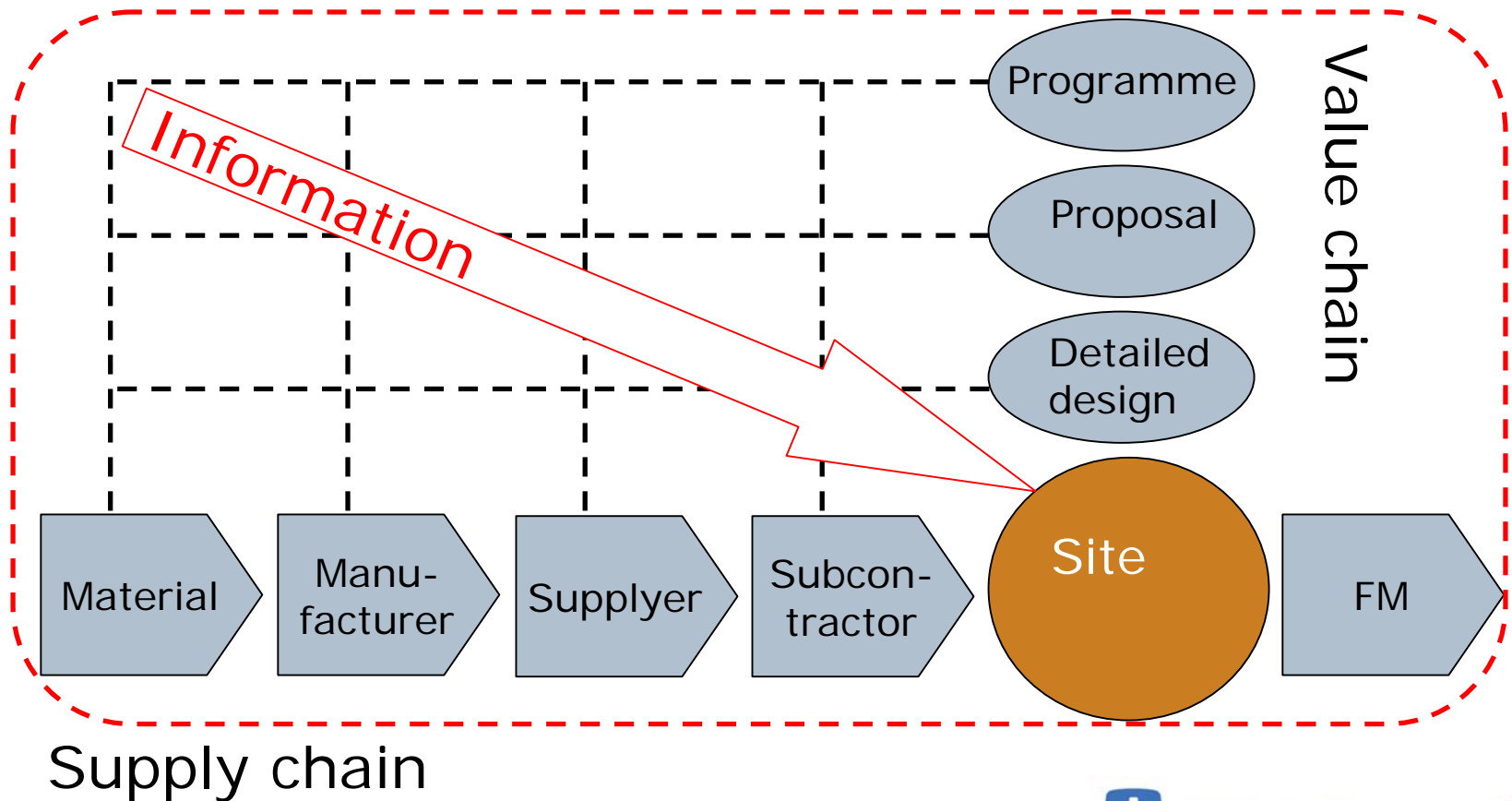
Pitfalls hindering an efficient building process



Communication in concurrent engineering



Information in concurrent engineering



Implementing Lean practices in Design & Construction



International researcher visiting the "Gefionparken" - a pilot project

TrimBuild® = Lean Construction

- Good practice in combination with a new view on process management:
 - **Organizing** teambased co-operation on construction sites with common goals and conditions
 - **Information** and decisions from customer and consultant, structured in project units for construction
 - **Planning** the building process with focus on pitfalls and bottlenecks
 - **Coordination** with the involment of the craftsmen's professional competences
 - **Resources** to the construction site optimized by the logistics of materials and equipment
 - **Follow up** and measuring on effect and process

Process planning

- Project units
 - information structured specifically towards construction
- Process plan
- Look-ahead design plan
- Job list for the coming 1-3 weeks

Process planning

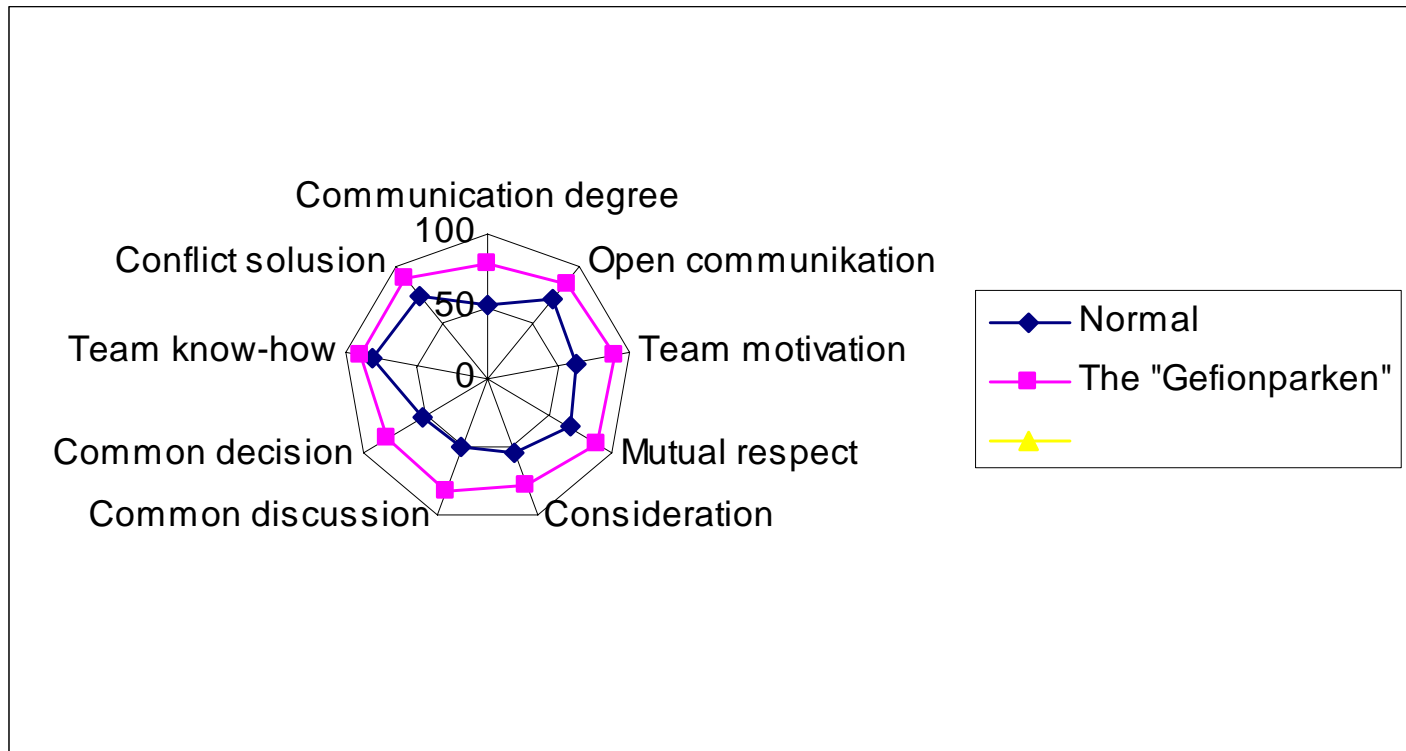


Information handover

- Output list with Project units for construction
- Preparing production of the Project units
 - Analysing "Build-a-bility" with the subcontractors
 - Project and subcontractor calculations
 - Planning and logistics
- Measuring the process with PPC/Indicators

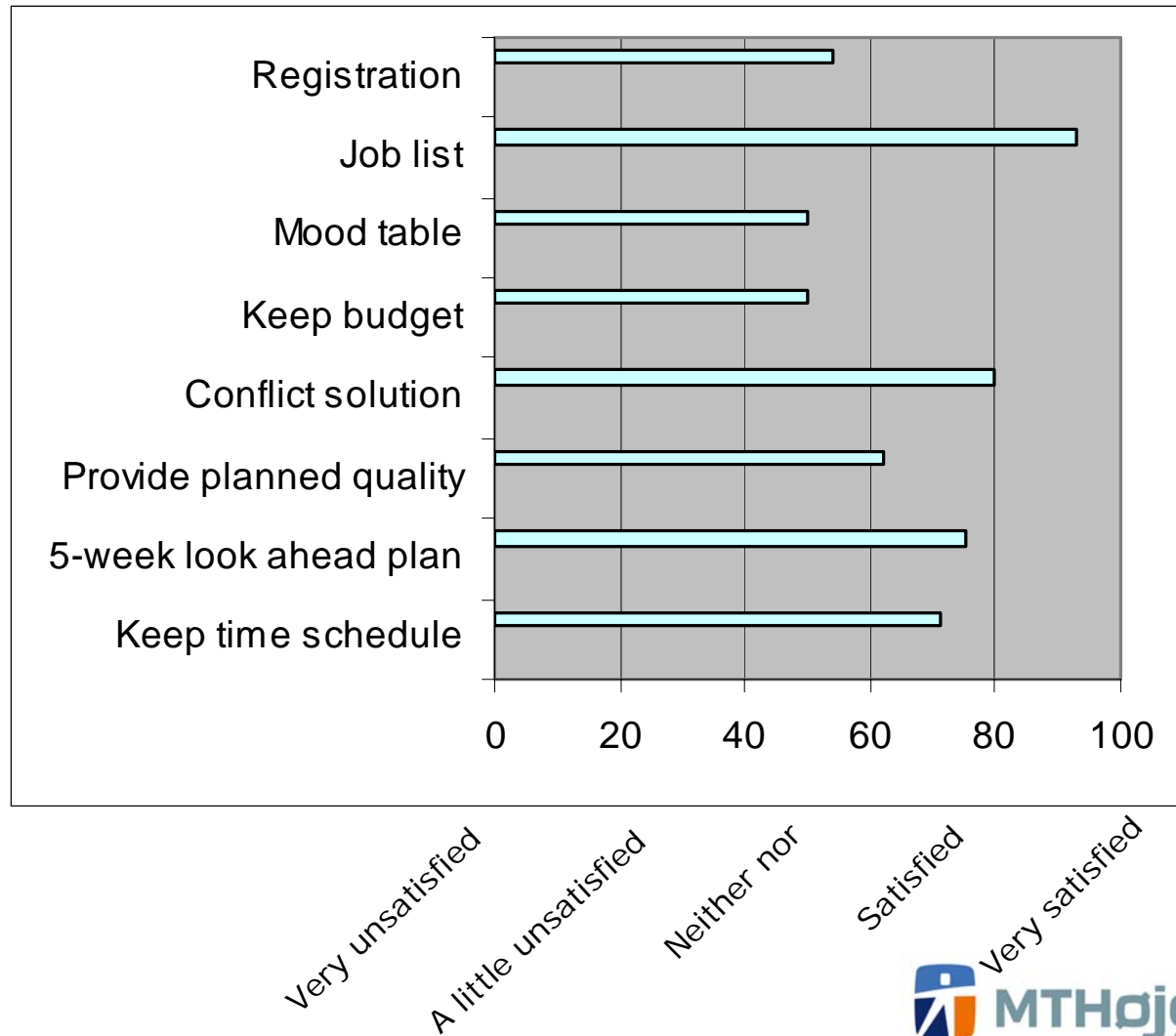
Measuring team co-operation

Analyses by the Danish Building Research Institute

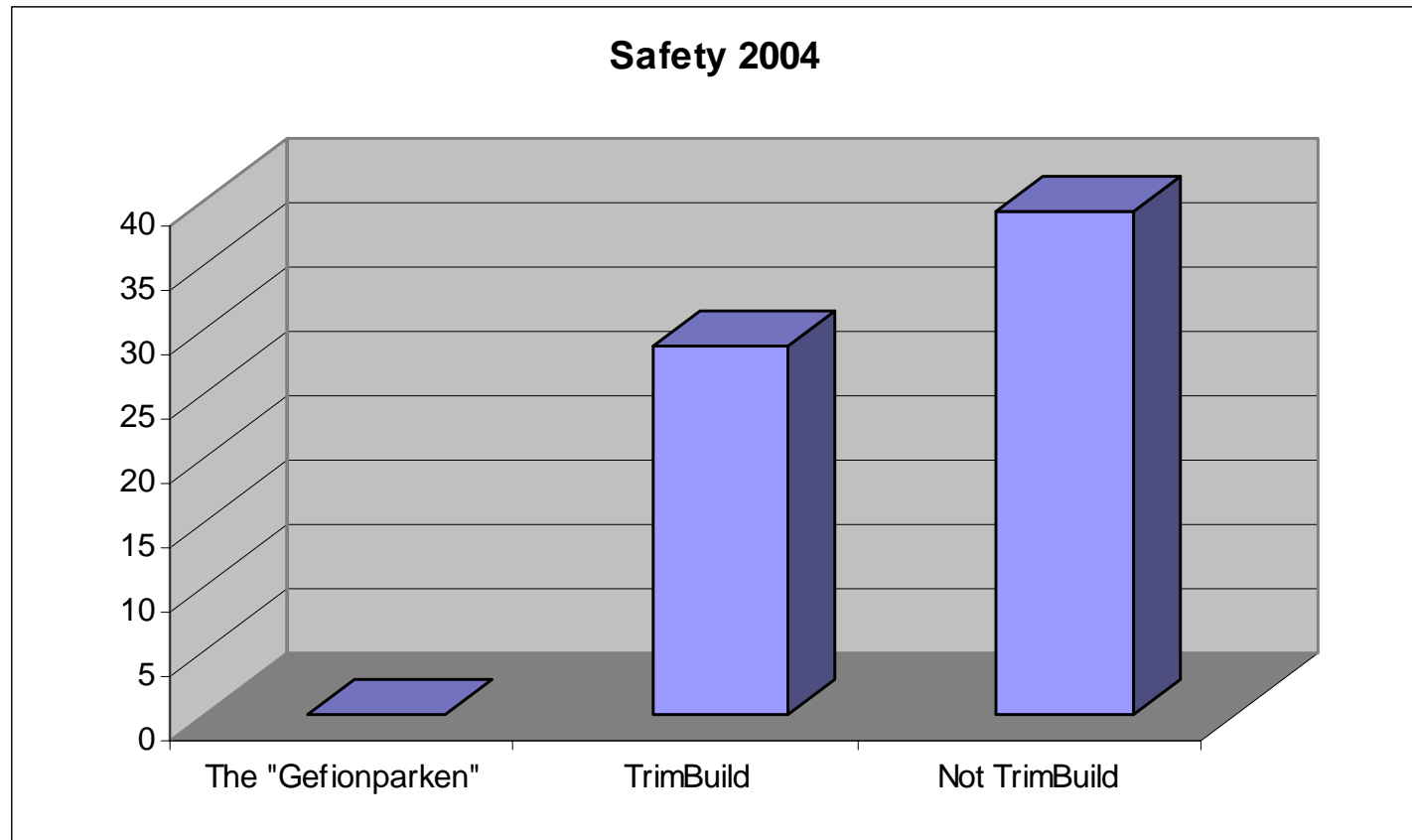


Measuring methods and tools

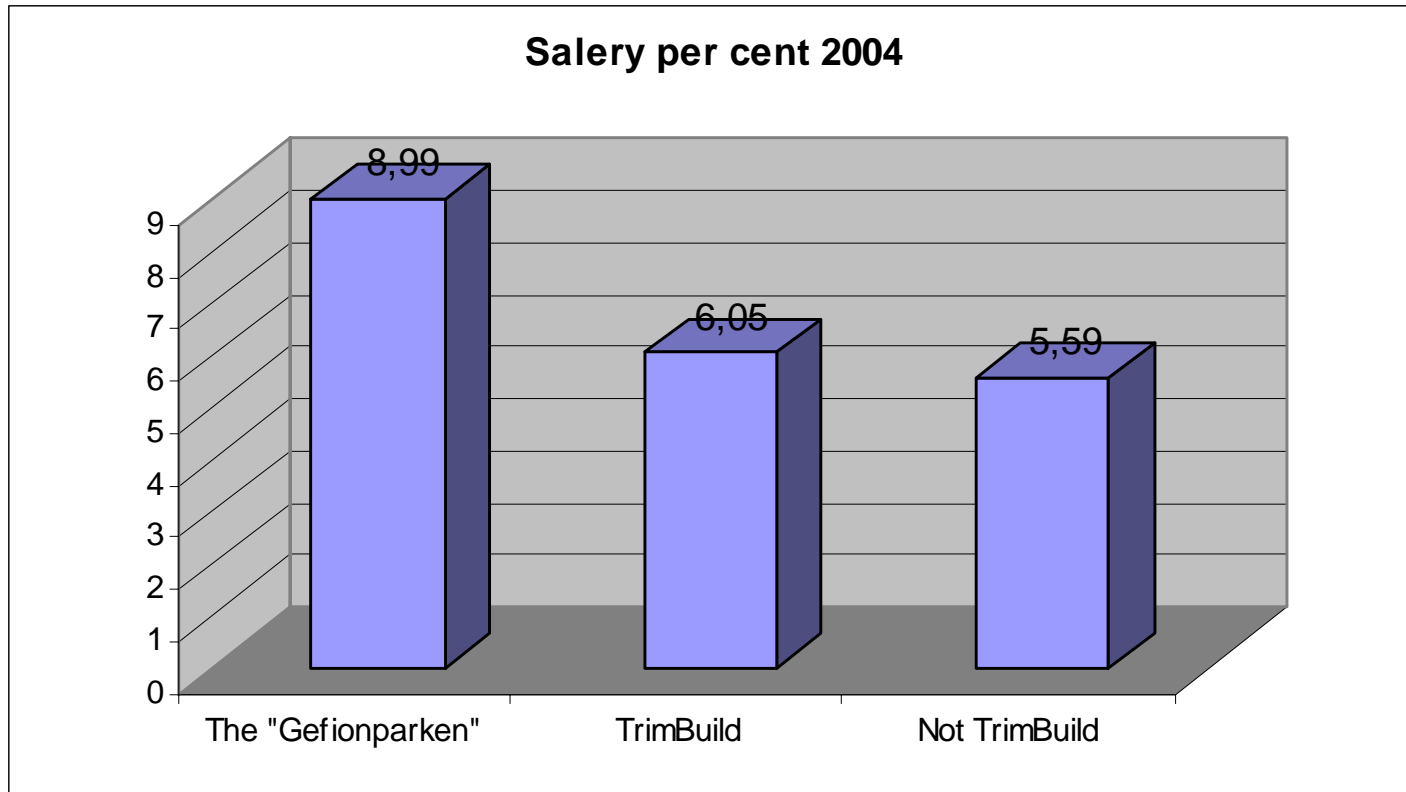
Analyses by the Danish Building Research Institute



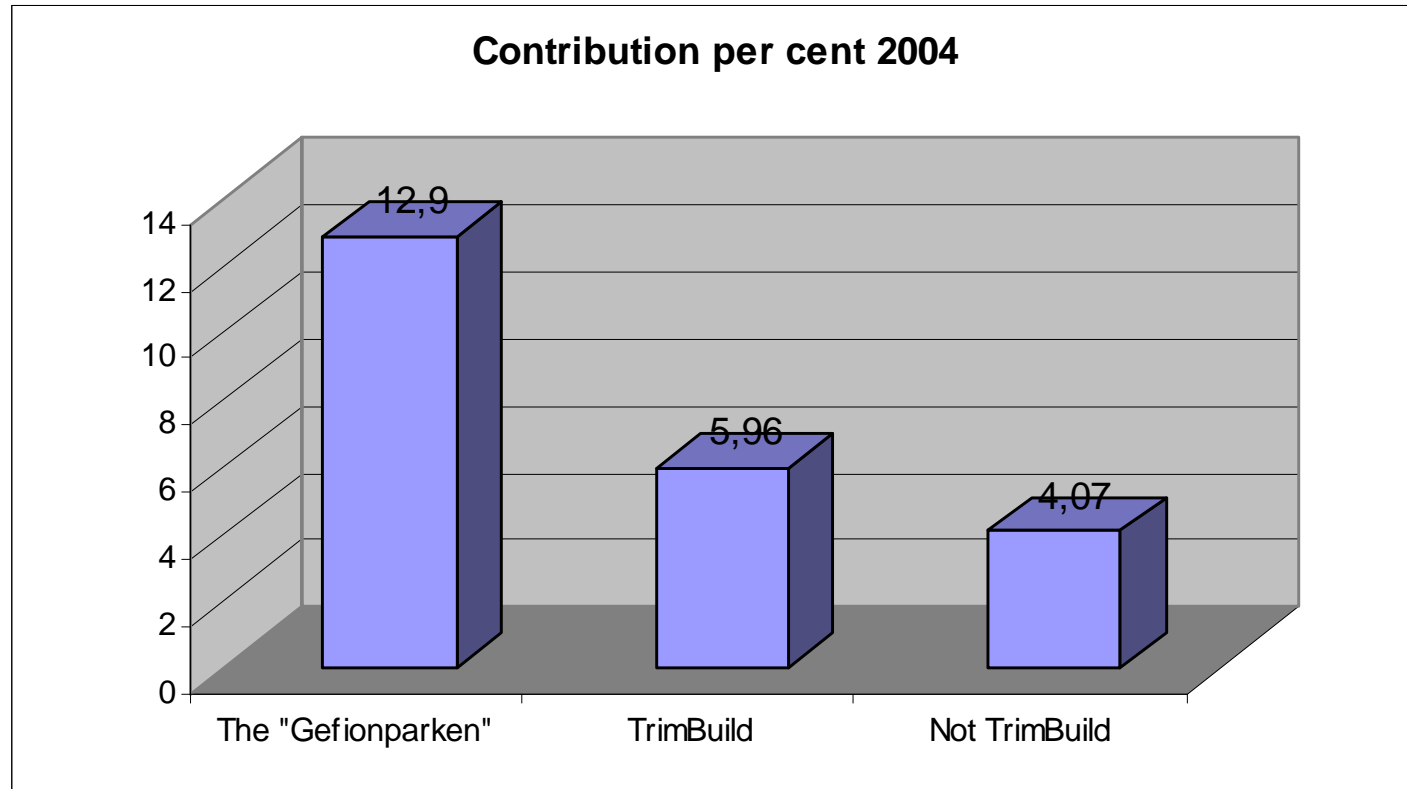
TrimBuild[®] and safety



TrimBuild[®] and management



TrimBuild® and subcontractor contribution



MT Højgaard

TrimBuild[®] - experience

Partly implemented on a 280\$ million budget in 2004:

- Short-term turnaround time
- Fewer defects at delivery
- Fewer working accidents
- Greater customer satisfaction
- Better co-operation when measuring on the construction site
- Better results for everybody concerned:
 - Project Management:
Steady at 8% contribution (Often 2-3% lower!)
 - Subcontractor contribution: + 5 - 15%
 - Crew piece-work: + 5 - 20%

Communication from Design to Construction



Process planning by the crew on the "Gefionparken"

Organizing the best team on all levels includes the crew



From hierarchy to team - a new organization of building sites

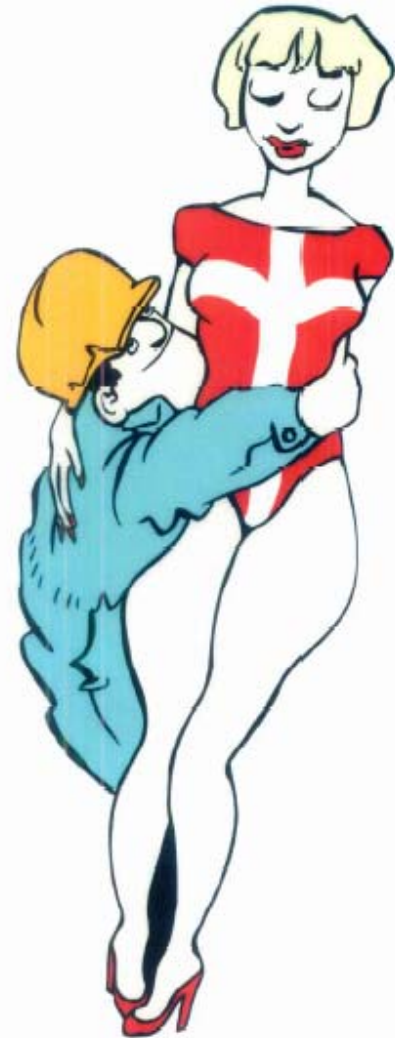
Tandem presentation:

- Sidse Buch, Political-Economical Consultant
 - The Federation of Building, Construction, and Wood Workers Unions in Denmark
- Dag Sander, Process Development Manager
 - MT Hojgaard, Business Development

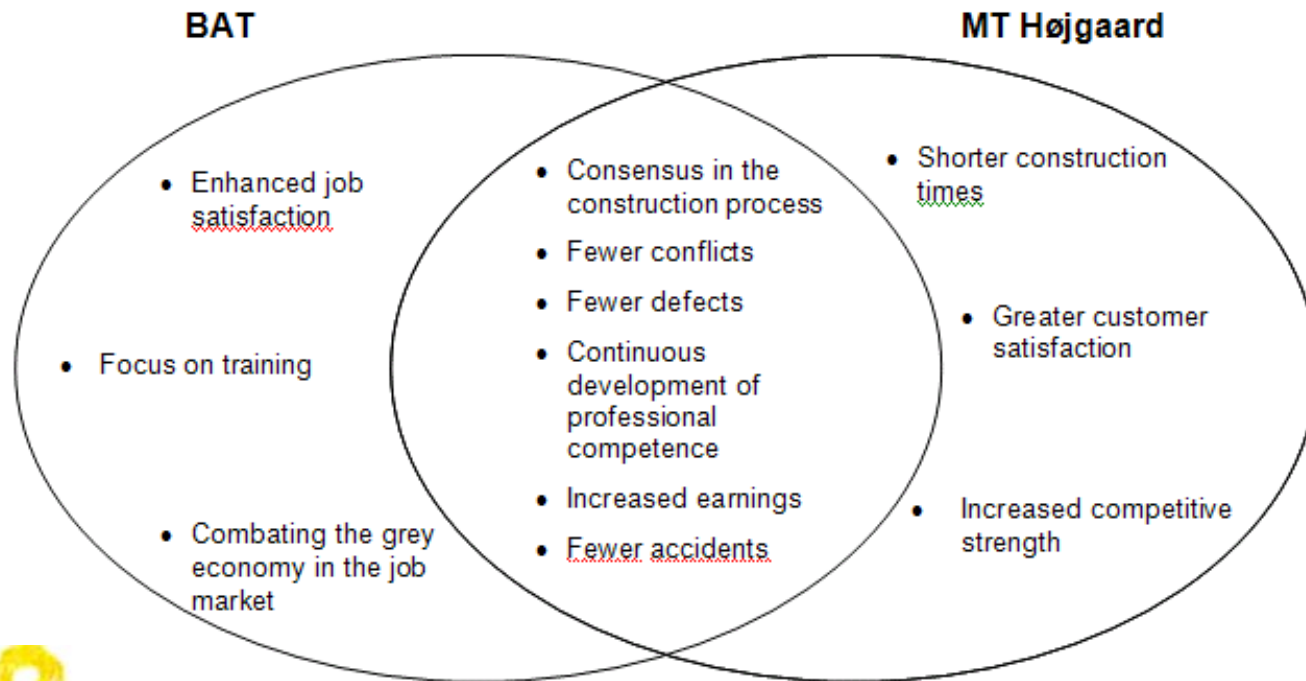


The Danish Model

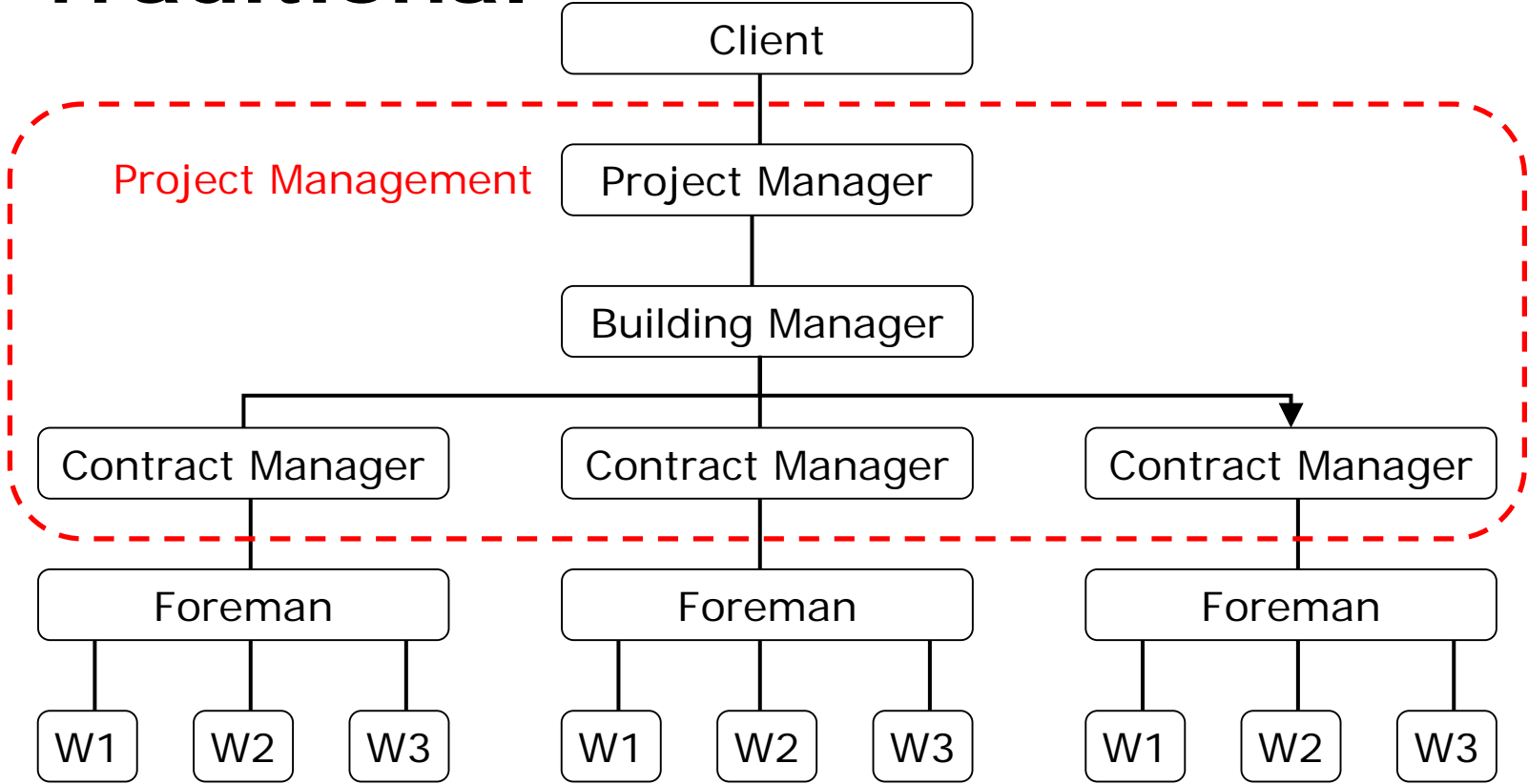
- 90% of companies organized
- 85% of workers organized
- Collective agreements
- No minimum wage set by law
- Employers and trade unions work together in a number of questions (e.g. health and safety, vocational training)



Common benefits for workers and employers

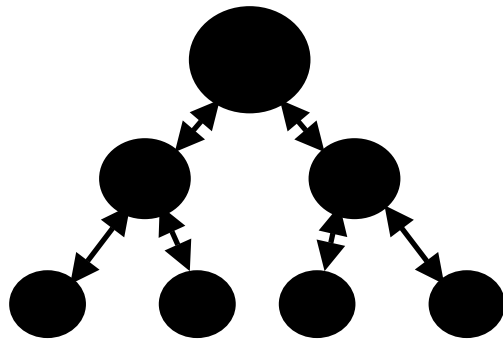


Traditional

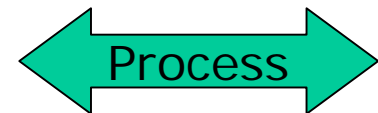
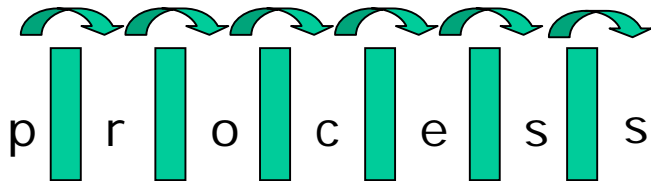
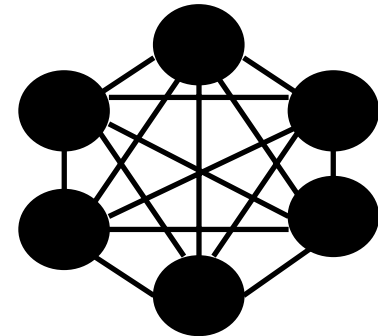


From divided functions to process

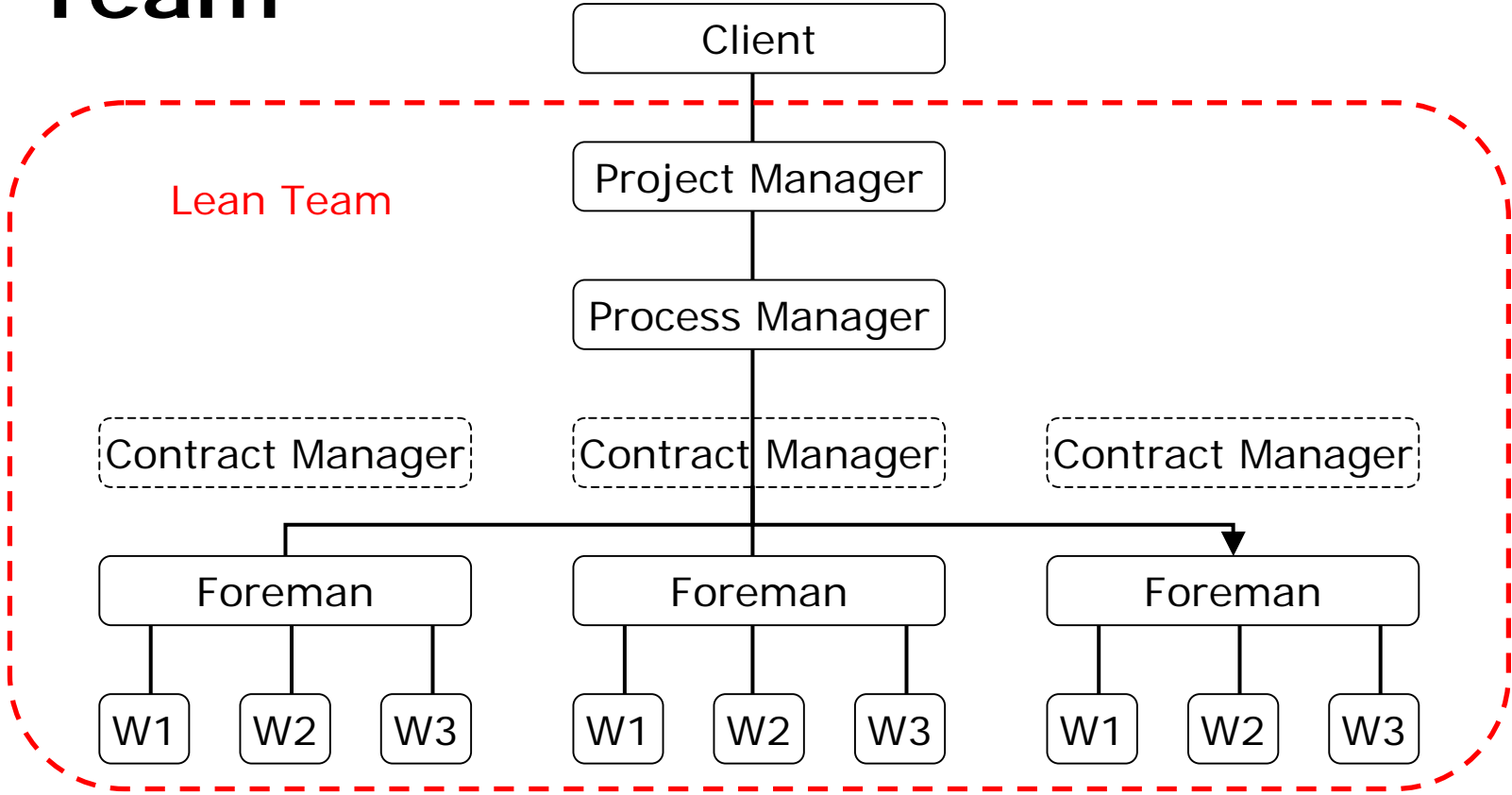
Hierarchy



Team



Team

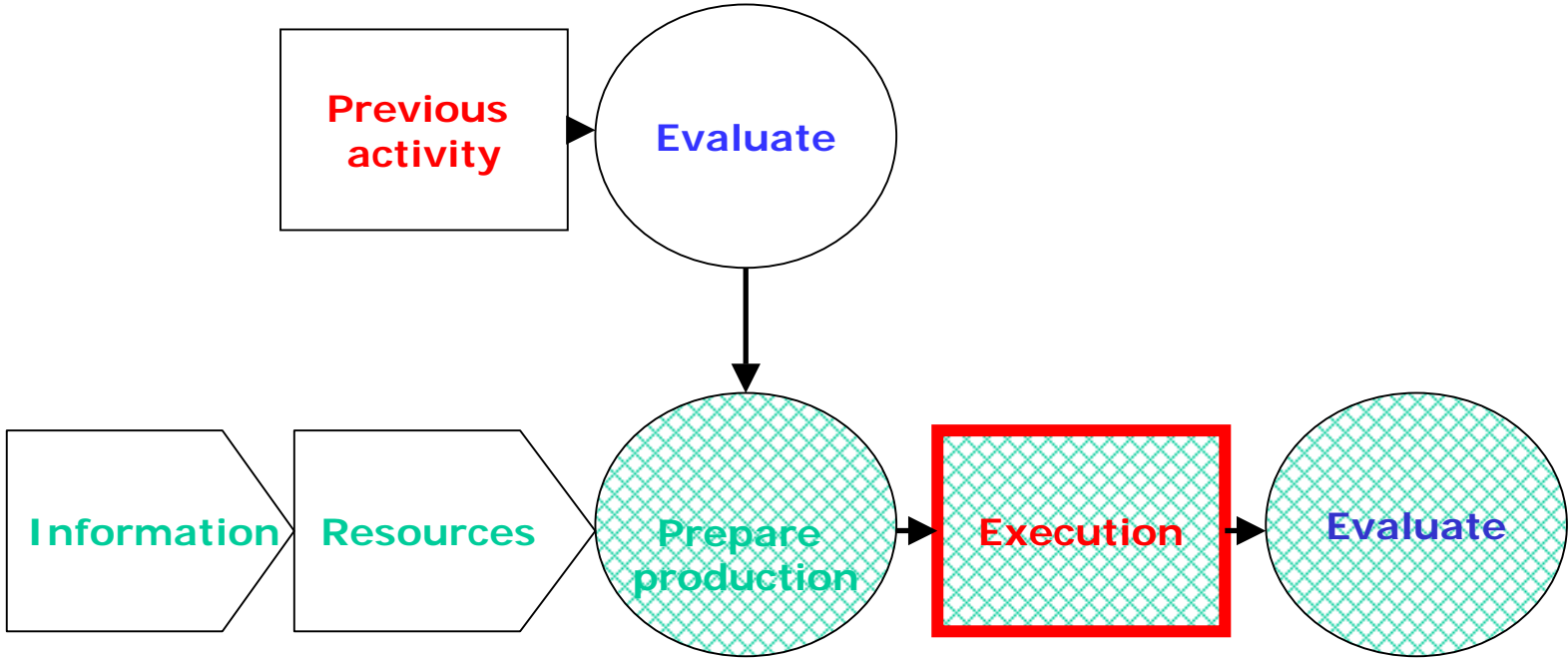


New roles on the construction site

- The middle management
 - From controller and planner to coordinator and coach
- The crew
 - “soft skills” such as planning, co-ordination, communication and co-operation



Crews' extended responsibility



Requirements in relation to a new organizational structure

- Focus on changed attitudes, values and norms
- Active involvement of and common understanding between all, from construction workers to management
- The goal is to create a sense of the site being

“my building site”

- Focus on new roles
- Training – the educational system must be ready



Pension Danmark

3 repeated housing projects with a learning process

- Process manager as a coach
- Crew education
- Crew process planning
- Measuring co-operation, safety and profit



Questions and comments

