

## ORGANISATIONAL AND CULTURAL PRECONDITIONS FOR EXTENDING THE USE OF TAKT-TIME PLANNING

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ISSUE: What are the underlying causes that inhibit extended use of TTP in construction processes?

Theory: Complexity theory combining phenomenology and philosophy of materiality. «Material Systemic approach (MSa)»

Research method: Theory-guided process tracing

Empirical data: two Norwegian building projects using TTP. Non-repetitive work

Research project KSS: Contract strategies and expert collaboration in building projects



Analysis

Timeline sequences forward. Chosen methods: step 0-4

Step 0). Theoretical foundation: Lean - (MSa)

Initial ideas	1). Projecting. C1: Standard C2: Lean ICE. Au.1	2). Construction planning. C1-C2: TTP Au.2	3). Transfer phase. C1-C2. Latency/activity Au.3	4). Building. Takt production. C1-C2: Standar- dized work. Au.4	Outcome: Uncontrolled materiali- sations
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Cases = C1: Sportshall – office section etc. C2: Hospital. Analytical unit (Au) step 1: Drawings-models. 2: Planning doc., 3-4: Drawings, models, and planning doc Backward process tracing: Unknown causes/reasons to outcome

Figure 1. Causal diagram. Building project. Theory-building process tracing

Outcome: Immediate problems (failures) in both cases: To low precision - models/ drawings/purchasing. Dominant problem: Structuring materials - carpentry Problem understanding ... counterfactuals ... problem-solutions



Theory-guided pocess tracing. Findings

Step 0). Theoretical foundations: Emergence and interpretative method - MSa

New methods step 0-4.

Initial ideas.	<ol> <li>Projecting.</li> <li>Self directed expert coordination. Struc- turing subject-axis.</li> </ol>	2). Building planning. Inc. integration drawings-TTP	3). Transfer phase. Proactive produc. controll. MSa organizing		Outcome. Controlled materiali- sations
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## Figure 2. Building project. Methodes to use in projecting and building based on counterfactuals

Organisational preconditions for extended use of TTP:

A: Counterfactuals step 1 og 2: 1). Increased emphasis on **process** management is necessary. Structuring subjects: Architects and building subject as coordinating-core and decision makers in the projecting phase. 2) Increased integration of the projecting process and creation of the Takt-time building plan

B: Counterfactuals step 3 and 4: High focus on proactive production control is necessary – and a kind of organizing that makes it possible continuously to develop plans and drawings to mirror emergence in production. Intensive obstacle analysis. Involvment of craftsmen and crewleaders in a continuous planning process



Theory-guided process tracing. Findings

Step 0). Theoretical foundations: Emergence and interpretative method - MSa

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## Figure 2. Building project. Methodes based on counterfactuals

Cultural peconditions for exteded use of TTP:

C: Counterfactuals step 0 and 3 and 4 (and 1 and 2). The process tracing supports the fact that an interpretive open and involving culture on construction site expand the possibilities of using TTP and Takt-production. The interpretive culture means e.g. that the actors in production continuously improve, adapt and interpret plans and standards (and drawings/models) to the real world in the physical production. Opposite: If Takt production is integrated into a culture where the actors only passively follow detailed standards, a predetermined perfect plan or a "perfect production system", then the utility of TTP and Takt production is narrowed down.