The Beauty of a Phase-overlapping Last Planner System with incorporated Takt

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BACKGROUND BASED ON LITERATURE

**Toyota Production System (TPS)**
- Minds + hands philosophy of the craftsmen/-women
- Work standardization and assembly line

**Last Planner System (LPS)**
- Production planning and control system
- LP integration to develop a reliable network

**Takt**
- Work structuring method
- Standardization and clear batch size

Commitment, Teamwork, Empowerment & Training

Incorporation
RESEARCH QUESTIONS AND METHOD

1. How does LPS function as a production system across the whole project and which role does takt play in the LPS?

2. How to design a production system for all project phases?

**Action research during the project**
- Discussions
- Meeting and plus delta evaluation
- Observations

**Case study research after the support**
- 21 interviews
- Lean close-out workshop for reflection
PROJECT OVERVIEW

- Project Start: September 2016
- Request for Building: December 2016
- Start LPS design phase: October 2016
- Start Foundation: June 2017
- End LPS design phase: December 2017
- Start Installation Interior: January 2018
- End LPS on site: December 2018
- Start Inspection: October 2018
- Start Furnishing: January 2019
- Constructional Completion: December 2019
- Lean Close-out: February 2020

Supported by Author 1

2016  |  2017  |  2018  |  2019
Overall Process Analysis
(common understanding)

Milestone & Phase Plan
(weekly basis)

Takt for repeatable areas

Specific areas with no sequence repetition

6 Week Lookahead
(daily basis)

Weekly Workplan
(daily basis)

Learning
/improve/

- Shell
- Interior office space 1. – 3. floor
- Interior core area 1. – 3. floor
- Exterior (partly)
- Inspection 1. – 3. floor

- Ground floor
- Basement
- Roof
- Outside facilities
- Commissioning

Only applied during construction and inspection
VIENNA
Design Phase

MUNICH
Construction Phase

Pull
REASONS TO ADJUST THE TAKT

- No error-free and no on-time delivery of construction documents
- Limited availability of resources in the market
- Lack of timely involvement of trades
- Shortage of subcontractor availability
- Shortage of labour
- Variable performance by the different work crews of a trade
- No availability or late delivery of material
- Late change orders by the client
- Delayed decision-making by the client

How often do you think this happens?
CONSIDER THE HUMAN FACTOR

One team consisting of...

1. Different personalities
2. Different attitudes and behaviours
3. Different languages
4. Different experience
5. Different learning speeds
6. Different expectations
PRODUCTION SYSTEM

Major outcomes

● LPS triggers minds + hands thinking
● LPS is a driver for productive conversation
● Takt is a good tool for repeatable areas
● Keep takt flexible for improvements
CONCLUSION

Design a production system that...

- Easily engages people to collaborate
- Span from design till handover
- Serves as marketplace for information, planning, re-planning and communication
- Integrate knowledge of the Last Planners
- That gives the team flexibility
- And where Team members feel free to voice their concerns

Adjust based on the teams needs and product request

Supported by the different organizations