

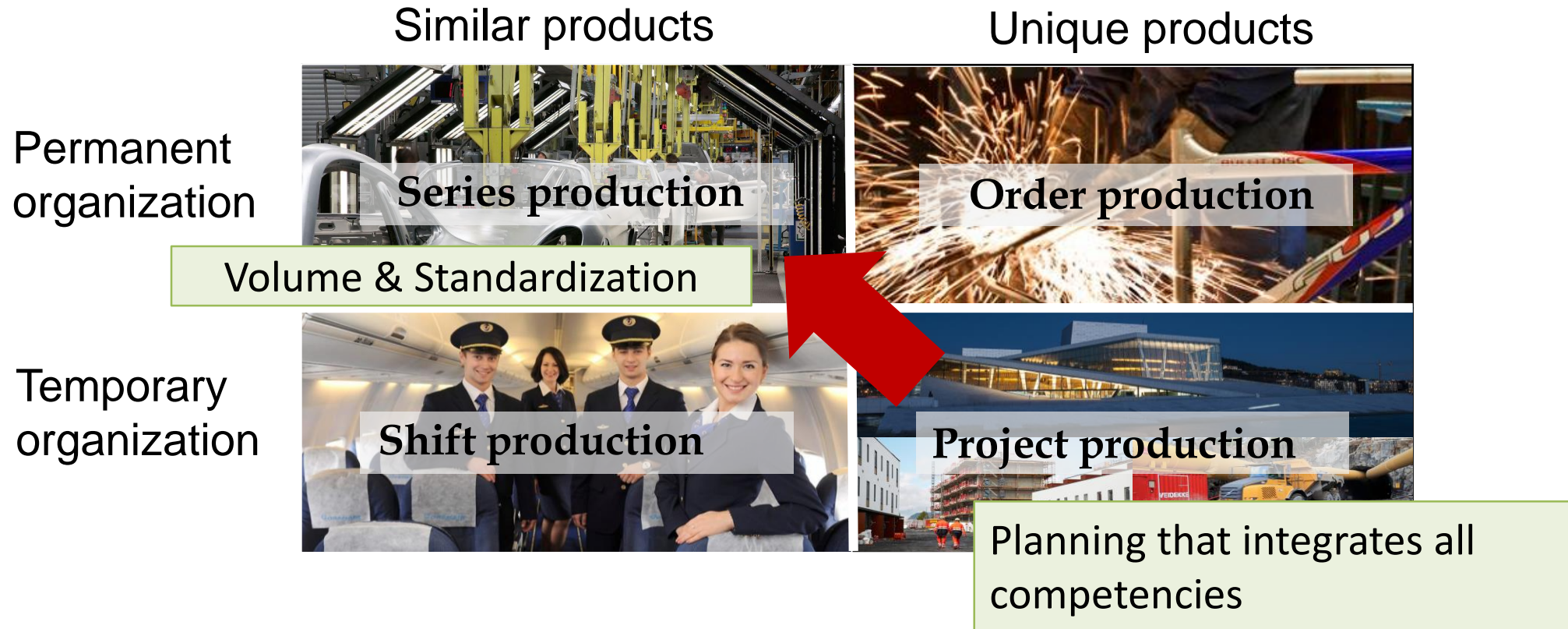
ID 236: HOW LONG DOES IT TAKE TO BUILD AN APARTMENT?

Authors: Sigmund Aslesen (presenting), Sigmund Reff and Espen Stordal

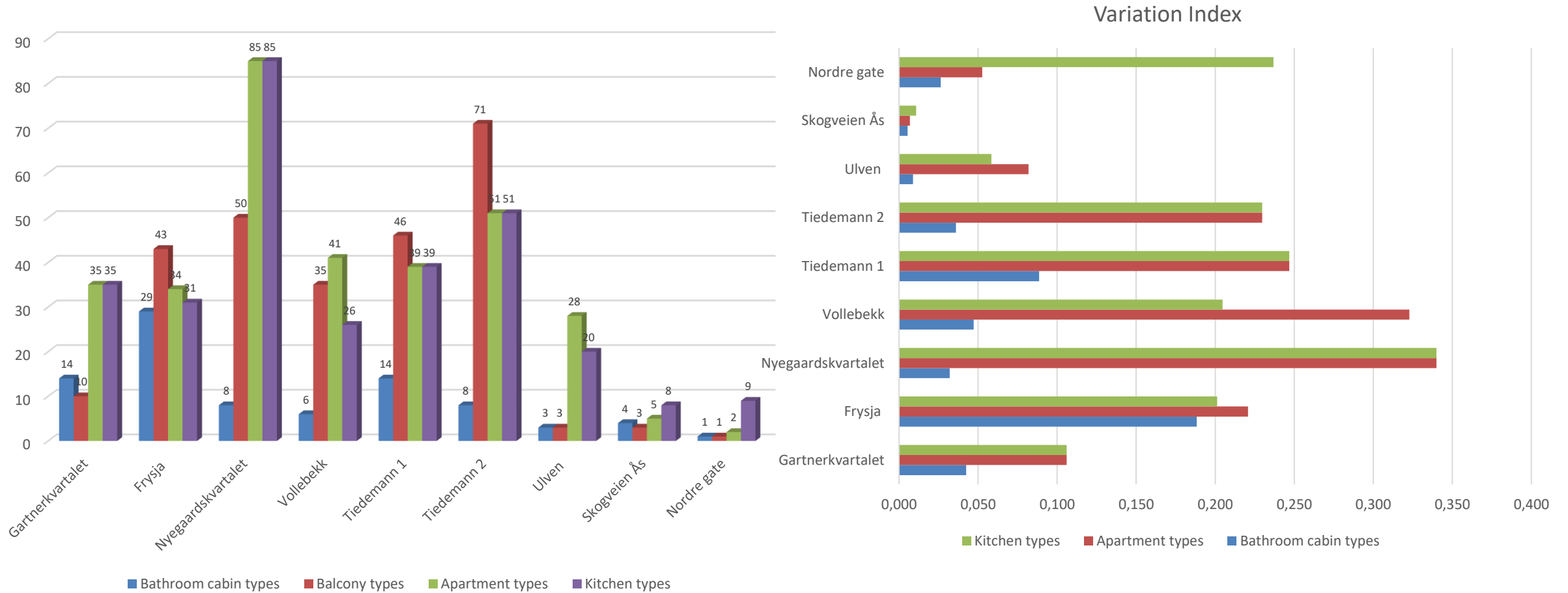
RESEARCH IDEA

- **To make construction more like manufacturing, we need to study it from a manufacturing viewpoint**
- **Starting point:**
 - Construction is characterized by one-of-a-kind projects, site production, a temporary organization and intervention of regulatory authorities (Koskela 1992)
- **The paper's reasoning:**
 - While these peculiarities have played a fundamental role to understand the uniqueness of construction....
 - One should handle them with caution so they do not hamper initiatives – and insights – based on the commonalities between construction and manufacturing production

WHAT KIND OF PRODUCTION IS THE PRODUCTION OF HOUSINGS?



Veidekke's residential housing projects in the Oslo region



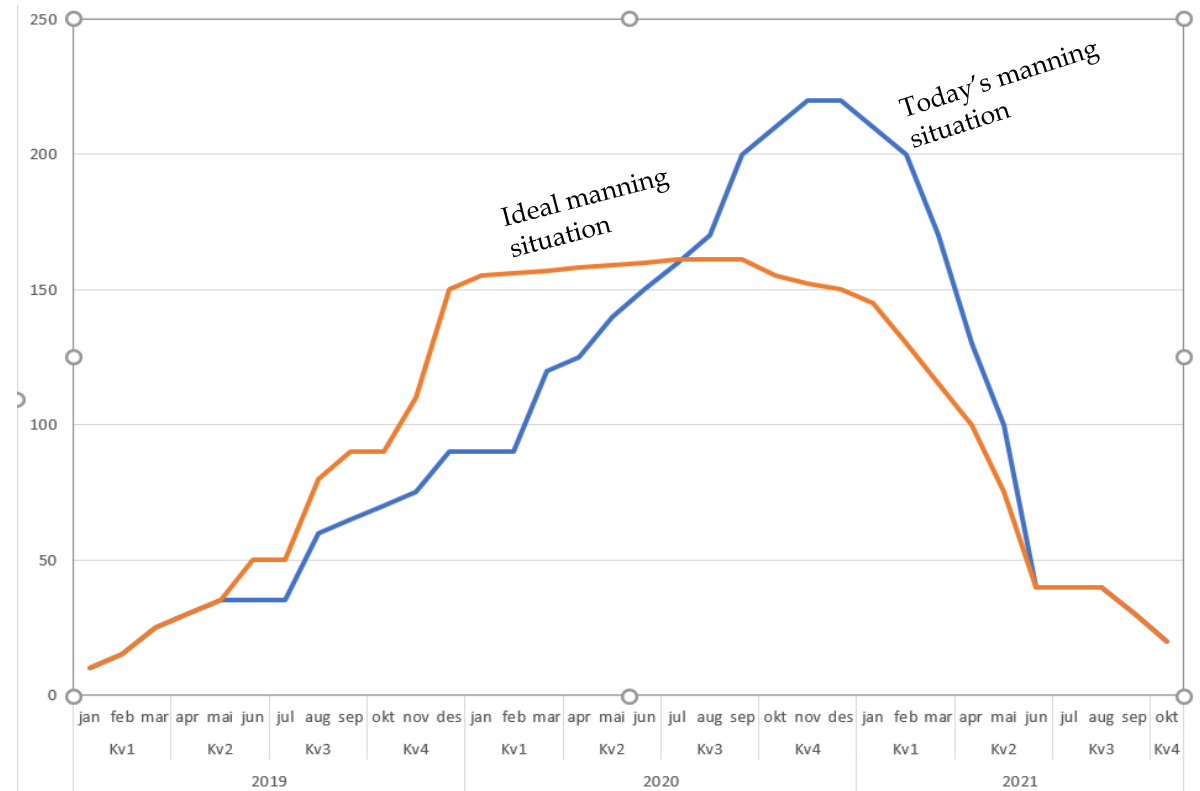
PRELIMINARY RESEARCH FINDINGS

- 127 apts. housing project in Veidekke:
 - Inventory phase spans over a period of 43 weeks altogether (holidays excluded)
 - Around 136 apts. completed on a yearly basis
 - Throughput time between 70-80 days for an apartment
- Porsche manufacturing plant in Leipzig:
 - A new Porsche Macan or Panamera rolls off the final assembly line every 3.8 minutes
 - Average daily production is 650 cars, and 150.000 a year
 - 8 hours throughput time per car in the final assembly

FIELD OBSERVATIONS

What's going on?

- Housing Production
 - Production goes on in parallel
 - It has a bell-shaped curve
 - Substantial amount of work in progress
 - A housing project is not completed before all apartments are completed
- Buffers and Variation
 - Total expected processing time: 13,5 days (for an apt.)
 - Processing time/Throughput time*100:
 - In the final assembly, the apt. is processed in less than 20 % of the time
 - The rest of the time, the apartment lies empty without being processed



HOUSING PRODUCTION – HOW TO MAKE IT MORE LIKE MANUFACTURING

What is the benefit of defining an apt. as the production unit?

- **Clear-cut focus on the product design**
 - Meeting customer demands within limits set by manufacturability and standardization, to avoid a high degree of variability in the production
- **Turn the mindset in the work force – from thinking about project completion to focusing on apartment completion**
 - Something that is not only handed over to the next trade, but also to the residents who will live there in the end
 - Trade workers to act proactively on quality, by doing things right the first time
 - Proactive learning, so that mistakes uncovered in one apt. is not repeated in the next one

How does it assist production to know how long it takes to build an apt.?

- **70-80 days gives us only a vague idea – neither precise nor informative**
 - Still, it made us aware of something very important – that the apartment lies empty without being processed for most of the time
- **Can work be structured differently so that the processing can go on with less downtime?**
 - Takt time planning
 - Switching of operations between trades, to reduce number of returns per trade
 - Split up processes more fundamentally – between vertical and horizontal work