CAN A TAKT PLAN EVER SURVIVE BEYOND THE FIRST CONTACT WITH THE TRADES ON-SITE?

Otto Alhava, Vili Rinne, Enni Laine & Lauri Koskela

3.7.2019
What Fira?
THE DEVELOPMENT OF THINKING HAS CREATED FINANCIAL RESULTS AND GROWTH

"traditional construction": Concrete

"Service construction": Customer

"Next phase": People

Group Revenue 2002 – 2018 (M€)
Fira is an innovative growth company in the construction business

Personnel ca. 350, owners personnel and founders
Why focusing to the TPTC and Digitalisation of the Site?
Our work on-site was based on our Virtual Design and Construction (VDC) process, in which the BIM (Building Information Management) is in core.
Every construction company have their own "Hollywood-bim" projects

(So did we)
Digitalisation on-site as of today (and by us, 2015)
BIM on site today (most advanced application in Fira 2015)
Communication on site

Instructions on site

Information management on site

TAPETT
POIS +
TASOITUS +
MAALAUSS
2C30
Construction Industry
Information Management in 1925

Information needed here

Information stored here
CONSTRUCTION INDUSTRY INFORMATION DAMAGEMENT CONTINUES IN 2014
Digitalised Takt Production
Case capella

Apartment building, 7 floors, 42 apartments (studios, double and three rooms), parking facilities, business bases, terrace, sauna and common spaces

First takt project, strategic initiative for the company

Relatively young project team

Digital site, apps and IoT; agile software development

=> 30% savings in throughput time of interior work
Tasks for takt production during interior works in Capella

Colour coding for interpreting the schedule for slides 30 ->
Takt schedule as planned

(in every takt presentation, this is what we see – maybe because the as build is not recorded?)
Takt planning in the first weeks

Printed schedule is very visual, easy to understand and use but awful to maintain and share
..and this is what actually happened (as reported from the work places)

Data from Fira SiteDrive visualised: **Plan is nothing, planning is everything.**
Integration of data gives us the big picture of takt process

Pink marks are from quality management software, Congrid, each represent one or more faults in apartment.

In the beginning of the interior phase, there were 400 detected faults.

Reset after first wave:
1) blocking faults: 150
2) standalone faults 300

Final battle: 2300 faults before handover

7 apartments with zero defects, 144 faults
How should we interpret the data? What actually happened?

We will be able to cut half the throughput time just integrating the trade partner management.
How did we manage to deliver project in time?
Scheduling, resource allocation and plans accessed directly from the work sites

+ conditions were monitored

Tasks are allocated and roadblocks reported on site (Fira SiteDrive)

BIM and quality reports used on site (Arcadia and Congrid)

Conditions monitored (Kaltiot, Haltian, Fira InSite)
Fira’s Open Data Platform integrated the data from point solutions

As planned schedule and status: trade partners report by using SiteDrive

Persons on site from SiteManager

Roadblocks reported by trade partners (reaction time 2 hours max)

Quality defects from Congrid
IOT information in Fira Insite

The very same hw and sw architecture provides us condition monitoring in real time.

**Fira InSite - Capella Olosuhdeseuranta**

**Temperature**

- Temperature curve in certain location
- Temperature in apartments over time (daily average)

**Apartments**

- Kerros
  - Valitse kaikki
  - Tyhjä
  - 1 krs
  - 2 krs
  - 3 krs
  - 4 krs
  - 5 krs
  - 6 krs
  - 7 krs
  - Muu

**Humidity**

- Tarkasteluajakso
- 12.8.2018
- 21.8.20
What was the needed Digital trick?
Building blocks for digital site

Next step is a transparent logically controlled installation

Social media for site
Access to BIM
Scheduling and resource allocation
Quality management
Access control
AR/VR on site

Integration Platform: Fira Open Data Platform

Smart tags
Speech recognition
Connectivity
Indoor positioning
IoT

Situation awareness

Fira InSite
Construction process started to create data automagically!

Suddenly the participants shared the same situation picture

**Scheduling and resource allocation application (Fira SiteDrive)**
- Workers receive work orders on site
- Workers sign on/off tasks on site
- Trades report roadblocks on site and receive status
- Foremen (GC) report resolved roadblocks on site

**Quality management application (Congrid and Congrid lite)**
- Foremen (GC) report quality inspections
- Foremen (GC) report quality defects
- Trades report corrections for GC

**Situation Awareness application (Fira Insite)**
- Status is used in daily management
- Foremen check the conditions on site
- IoT data is automagically collected from sensors

**Data Integration Platform (Fira Open Data Platform)**
Three steps for digitalisation

Digitalisation requires successful implementation of common behaviour (Common business process)

1. On-site connectivity
2. Common TPTC process and apps on-site
3. Platform for integrating the apps