

Takt as a Production System

The goal?

Cost-effective, high-quality and reliable flow

Data-driven production and real-time situation awareness

The problem?

The project nature of everything we do leads to a large amount of variation and waste

Projects are planned, projects are subcontracted, projects are managed, projects are scheduled, production is organized into projects, development is also continuous pilot projects

Improvements are made in projects. We achieve good results in projects. We forget everything and start over.

Stability and continuity are missing. The organization does not learn.

Solution

standard processes, standard product, continuous improvement



Traditional production and schedule

Long lead time and a lot of unfinished work

Big work areas

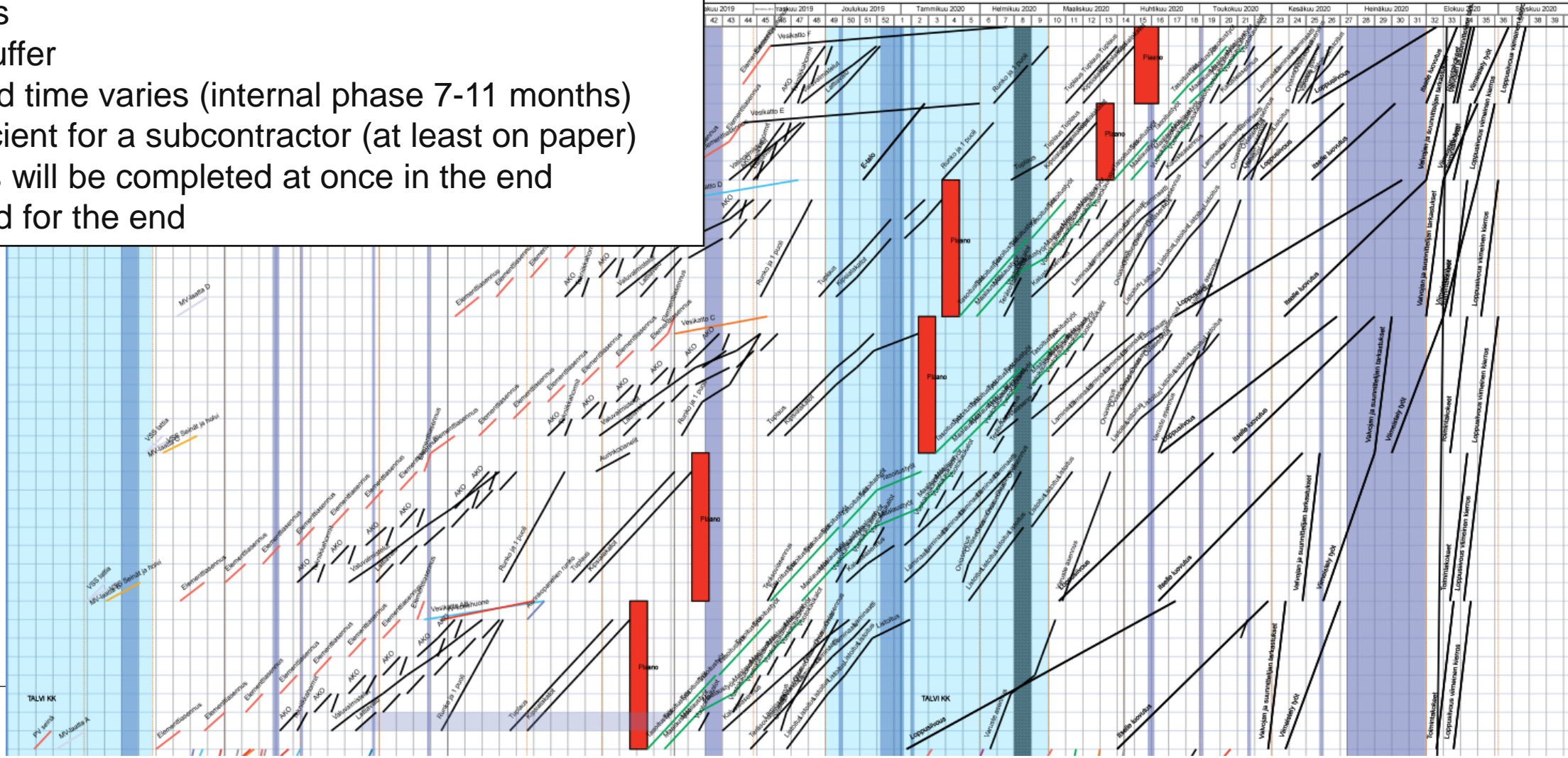
Lots of time buffer

Apartment lead time varies (internal phase 7-11 months)

Resource-efficient for a subcontractor (at least on paper)

All apartments will be completed at once in the end

Chaos planned for the end

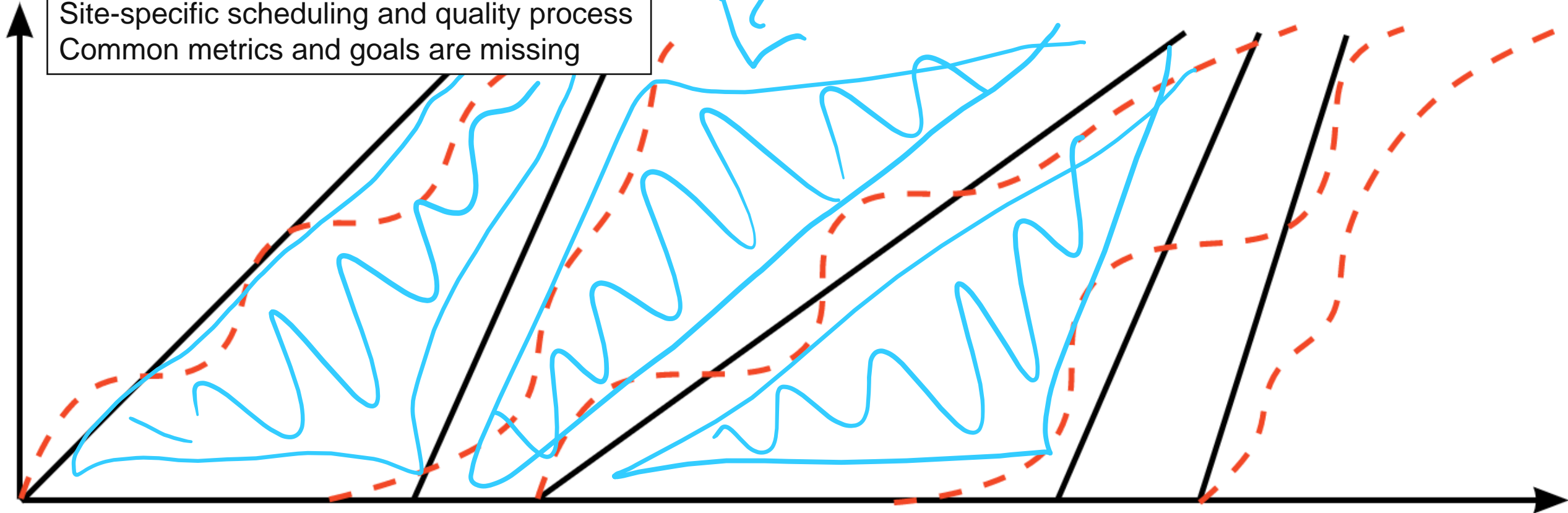


Traditional production and schedule

Long lead time and a lot of unfinished work

- Client's design
- Project procurement
- Unpredictable subcontractors
- Subcontractor driven logistics
- Site-specific scheduling and quality process
- Common metrics and goals are missing

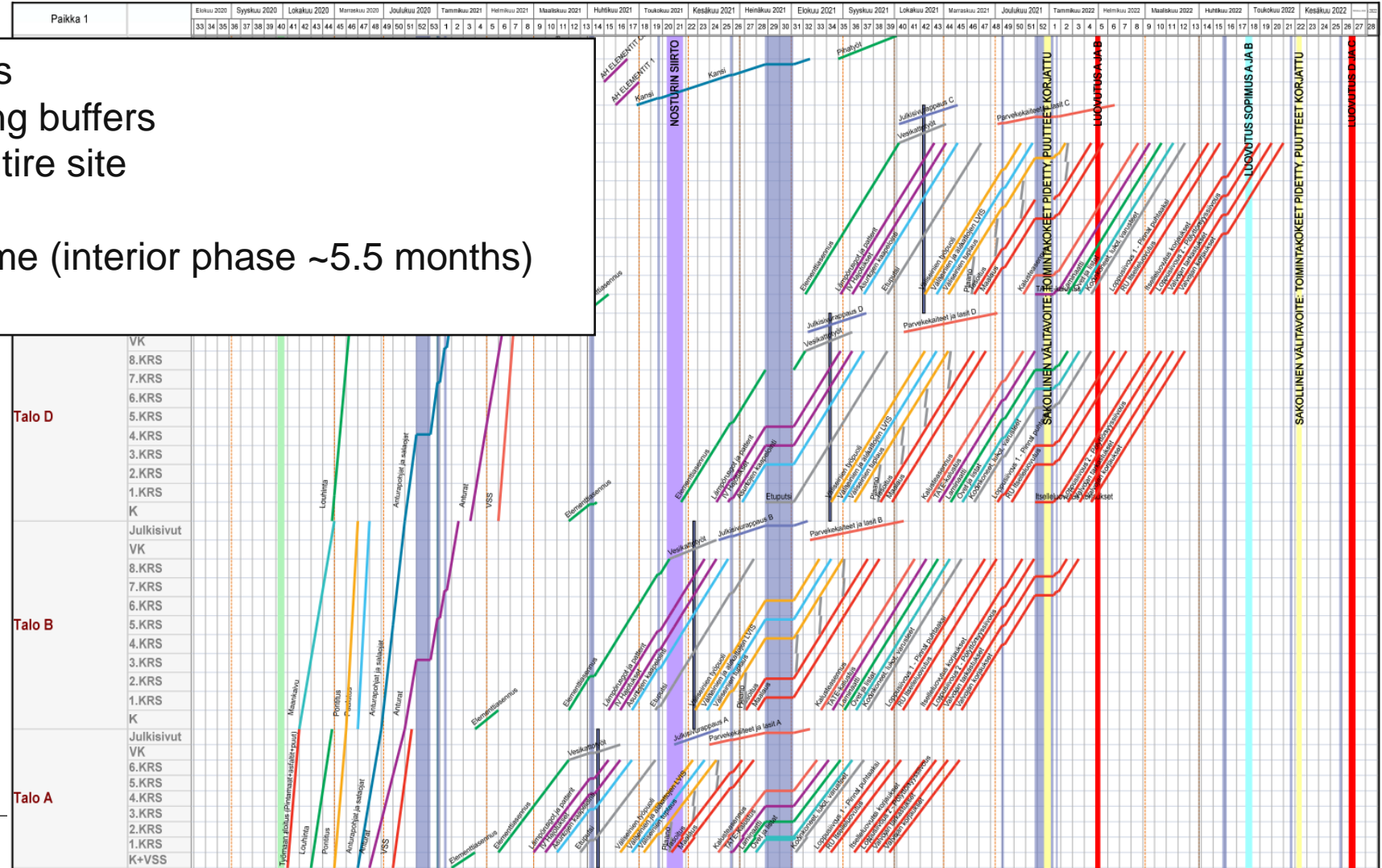
Handwritten blue text: PUSKURERVA



Takt production with a lot of variation

Shorter lead time and less work in progress

Same pace for all work phases
 Smaller work areas and starting buffers
 One train flows through the entire site
 Buffers moved to the end
 Apartment lead time is the same (interior phase ~5.5 months)
 Controlled hand over

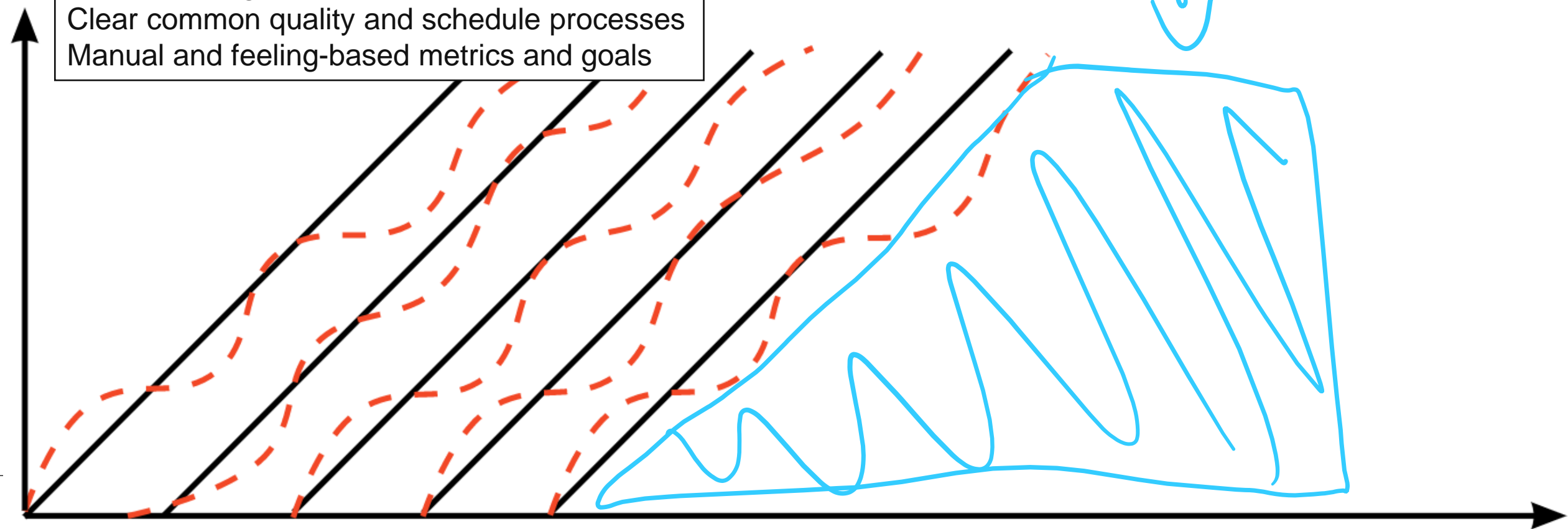


Takt plan and a lot of variation

Shorter lead time and less work in progress

- Fira's design (apartment library)
- Centralized procurement
- Familiar reliable contractors
- Site-driven logistics and terminal
- Clear common quality and schedule processes
- Manual and feeling-based metrics and goals

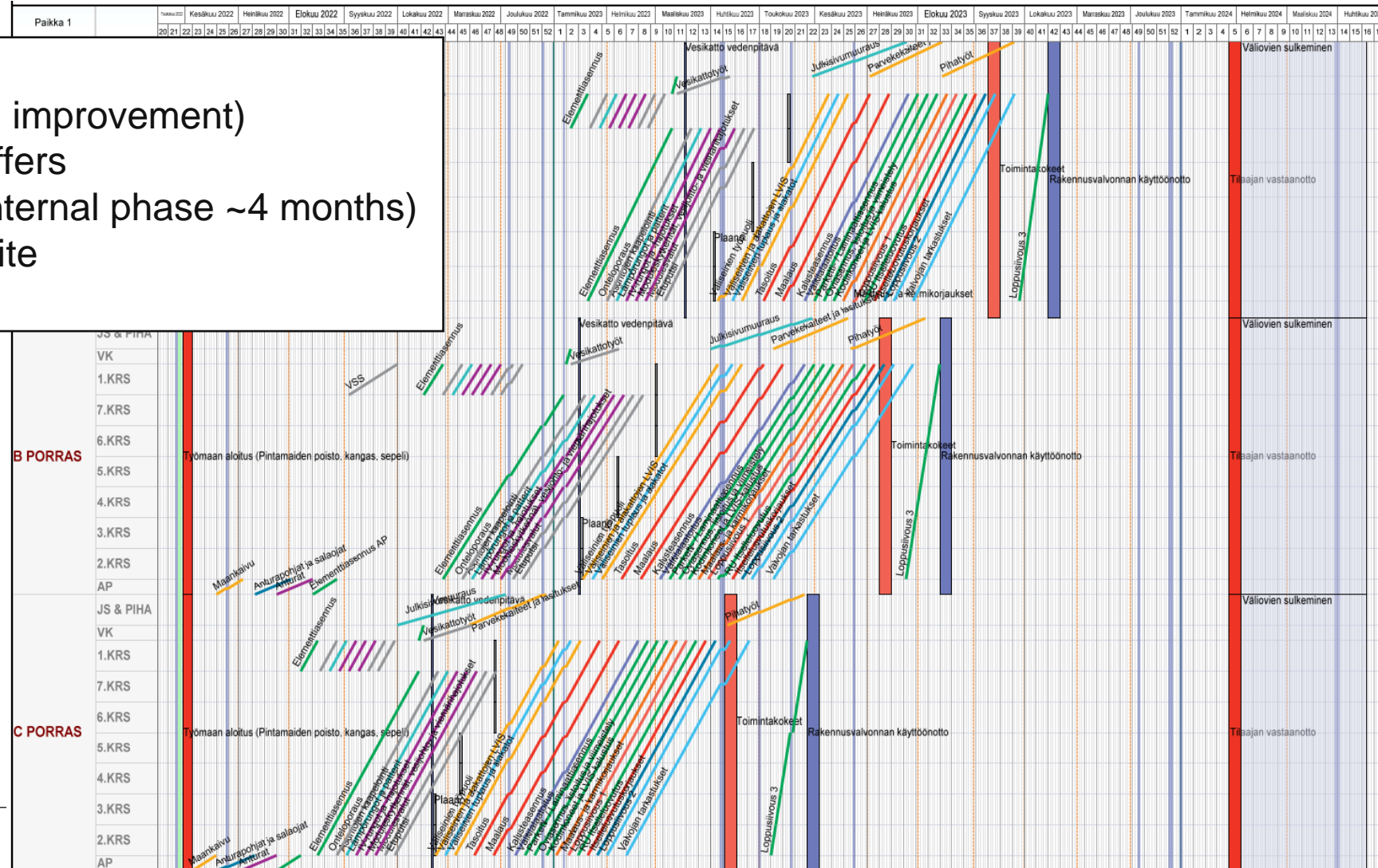
PUJKU
LOPUSK



Takt plan and little variation

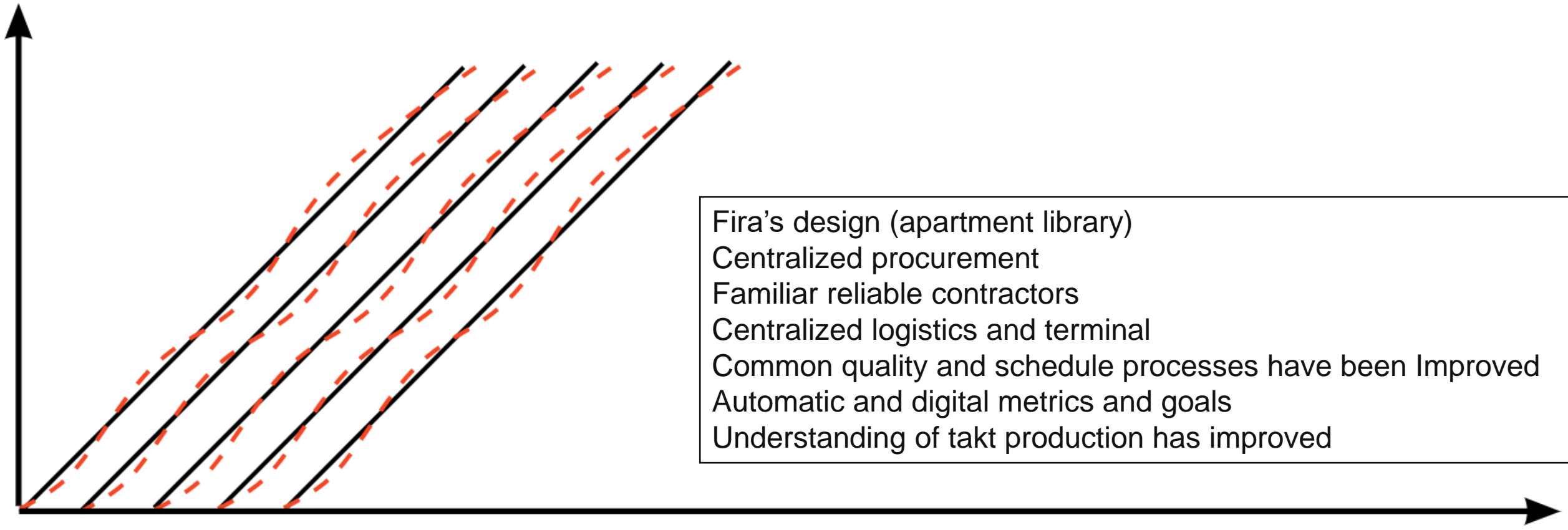
Short lead time and little unfinished work

- Optimizing
- Process reorganization (continuous improvement)
- Smaller work areas and starting buffers
- Apartment lead time is the same (internal phase ~4 months)
- One train flows through the entire site
- Controlled hand over



Takt plan and little variation

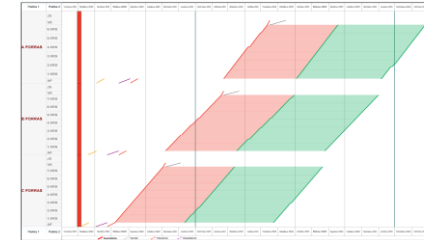
Short lead time and little unfinished work



Results so far?

- 2018 averages

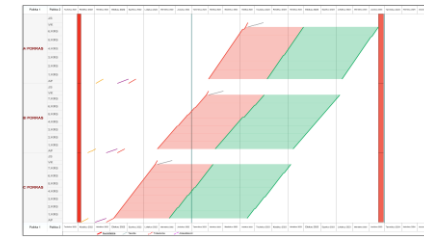
Concrete frame: 17 elements/day
Interior works: 40 weeks



21
months

- 2022 averages

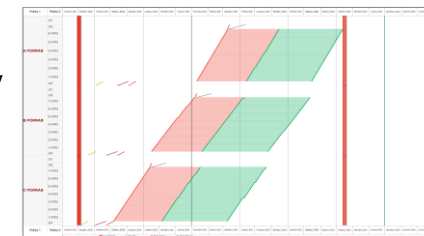
Concrete frame: 19 elements/day
Interior works: 35 weeks



19
months

- 2022 best projects

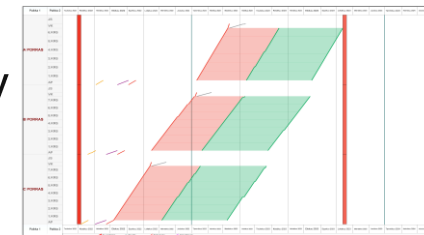
Concrete frame: 22 elements/day
Interior works: 30 weeks



16,5
months

- 2023 best projects

Concrete frame: 30 elements/day
Interior works: 20 weeks



13,5
months

Takt production

production made as simple as possible

Let's do it in the right order, at the right time, all at the same pace

All work is done at same pace

Everyone knows what is expected of them

In every takt it is ensured that the next takt area is in order

In every takt the work in the takt area is fully done

In every takt improvements are made to make next takt easier

Improving flow

standard processes, standard product, continuous improvement



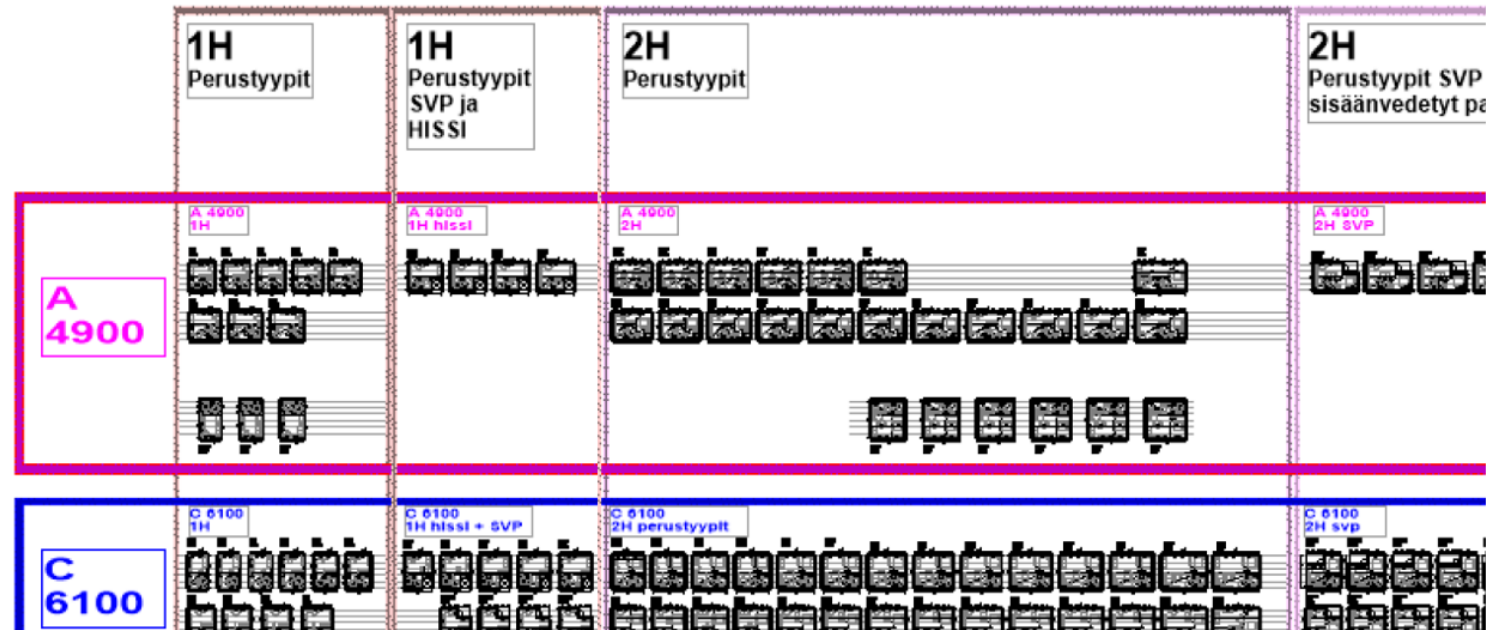
Apartment library – Standard design

Several hundred apartment plans developed together with clients

The main technical solutions for the apartments have been standardized (MEP, Bathroom, Furniture)

The apartments are assembled into buildings that suit the client's needs

Reliable high-quality plans for production make it easy to succeed on site



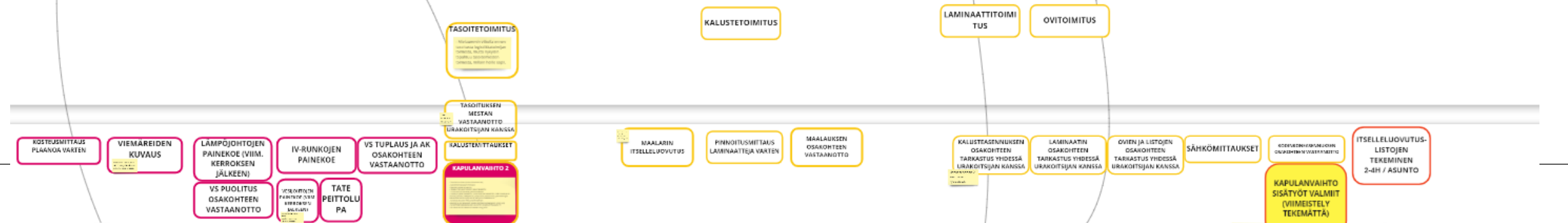
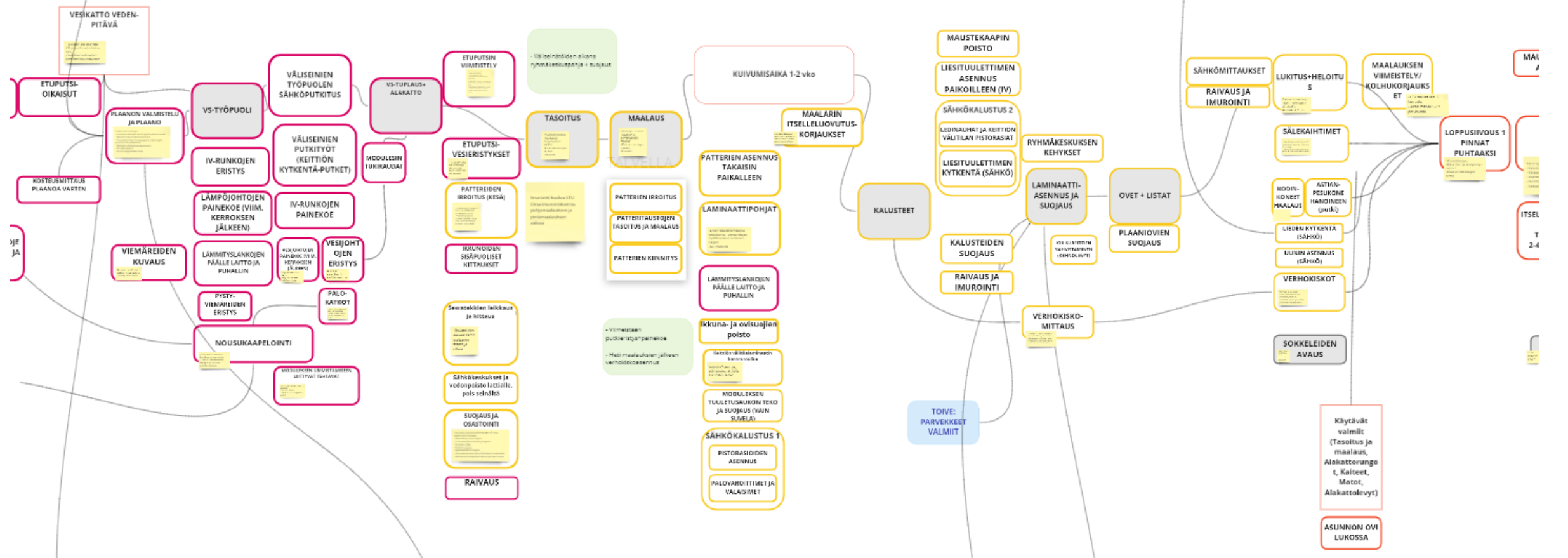
Production process is the core of takt production



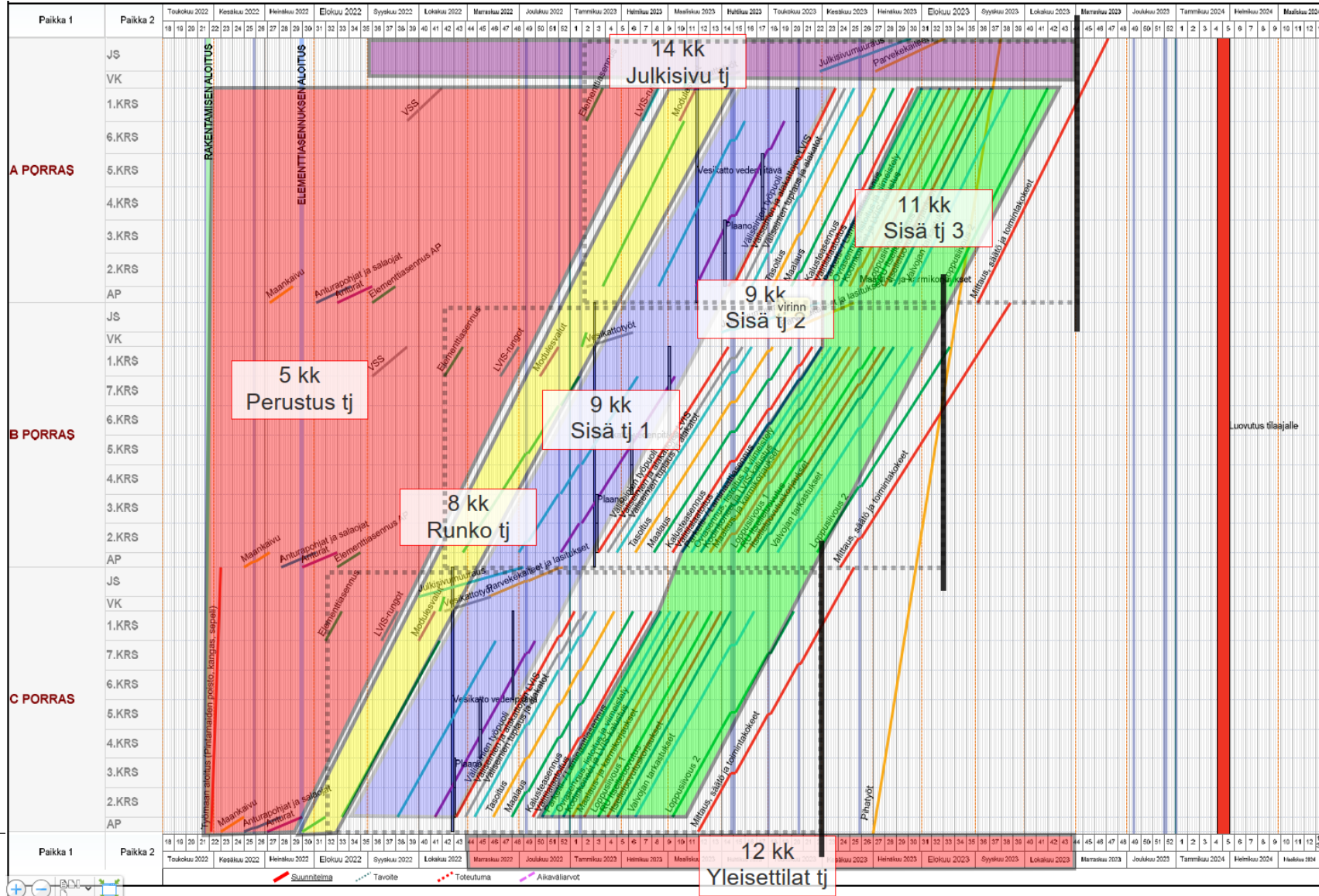
PLAANOSTA LÄHTIEN (KUIVASTA SISÄVAIHEESTA LÄHTIEN) KERROSRJESTYS KÄÄNTYY 2. KERROKSESTA ALKAVAKSI

Production process is the core of takt production

KERROKSESSA HUHDÄÄN



Business Portfolio Flow – Standard teams and partners

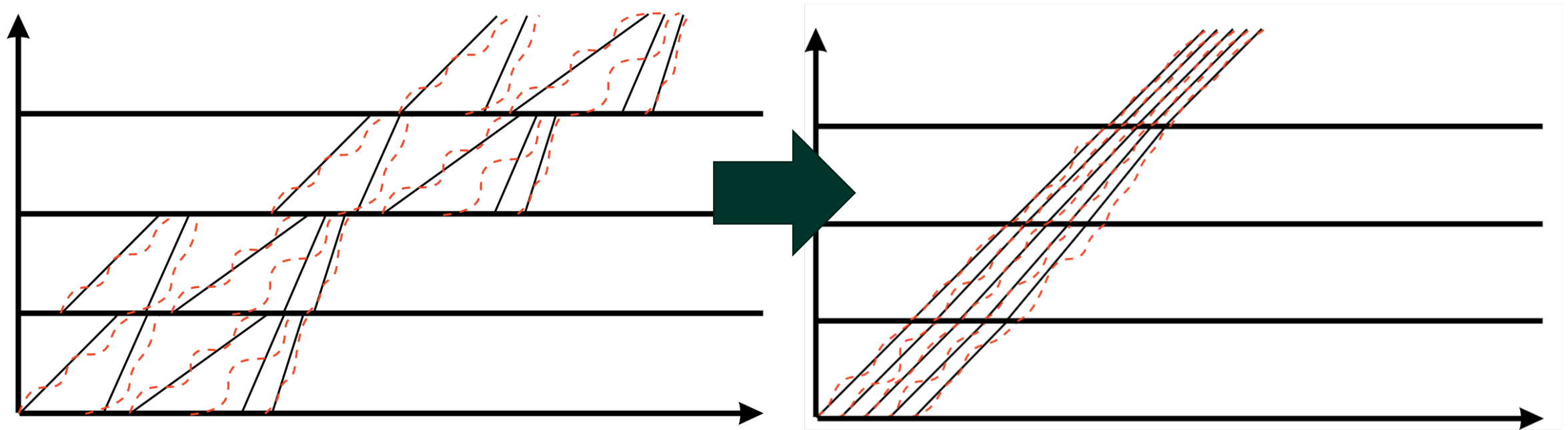


Improving flow

standard processes, standard product, continuous improvement

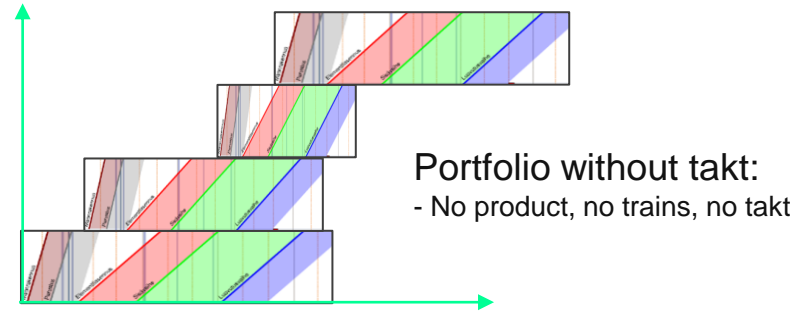
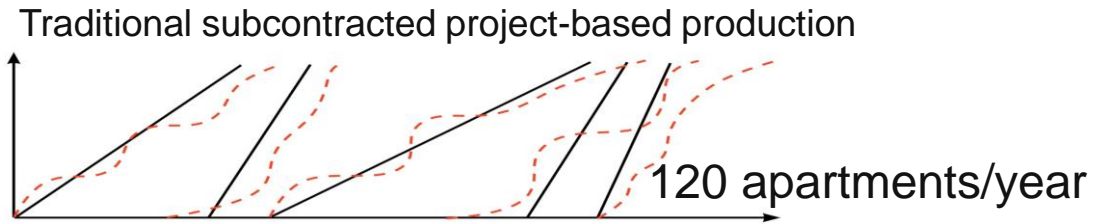
Unique projects

Business Portfolio Flow

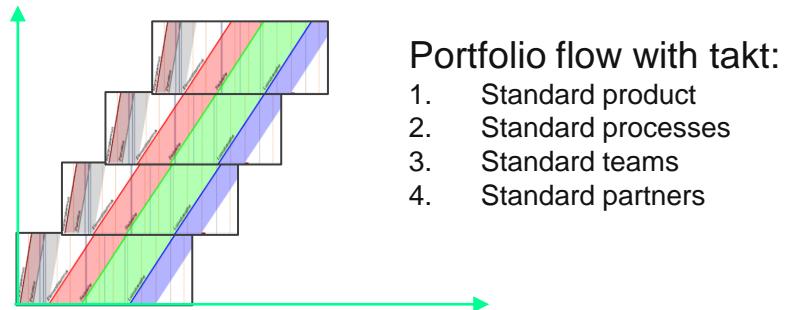
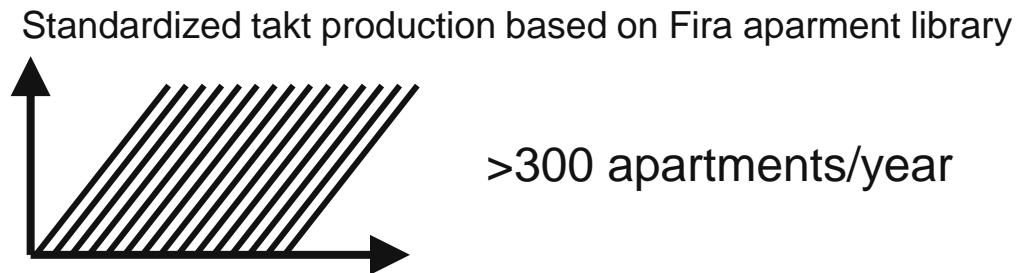


Business Portfolio Flow

Projects without takt
lead to a portfolio without takt



Projects with takt
enable a portfolio with takt



Better flow and quality with real-time situation awareness

Project overview

Fira
Syväkiventie yleiskuva
VIIMEISIN PÄIVITYS: 27.9.2022 6.48

Opaalikuja 2 → Spinellipolku → Syväkiventie →

MVR-/TR-taso viim. 6 viikkoa

Työmaavahvuus

Laatu

Tehdyt tarkastukset / Kypsyyssmallin mukaiset tarkastukset

Aloituspalaverit	Malliasennukset	Mestän vastaanotot	Osaakohteen tarkastukset
8 / 8	15 / 16	6 / 6	44 / 60

Asuntojen itselleluovutusprosessin tilanne

RU Itselleluovutus tekemättä	RU Itselleluovutus tehty, mutta asunnossa avoimia havaintoja	RU Itselleluovutus tehty ja havainnot korjattu
61	(Tyhjä)	(Tyhjä)

Työmaalla toimivat urakoitsijat

Viikko/Urakoitsija	Vahvuus k.a.
39/2022	32,0
AARIF OÜ	0,5
Aret Rakennus Oy	1,5
ARSENAALI OY	0,5
Artic-Kaihdin Oy	0,5
Anvolukko Oy	0,5
BAFO Talotekniikka Oy	0,5
Barona Rakennus Oy	0,5
Clarius Oy	1,0
EL Rakentaja Oy	0,5
Fira Rakennus Oy	4,0
Hortensis Oy	2,0
J. Mehtälä Oy	0,5
Jokiloisten Muototeräs Oy	0,5
KEIMOLAN PUTKI OY	0,5
LTU Asunnot Oy	2,0
Lujasys Oy	1,0
Maanrakennus T. Kronvall Oy	0,5
Mestarinikkarit Oy	0,5
Mirontek OÜ	2,0
Niemi Palvelut Oy	1,0
OTEPEST OY	3,5
Oy M. Furu Ab	0,5
Puuhaax Oy	0,5
Raksa-Trio Oy	0,5
Riikku Group Oy	1,5
Yhteensä	56,9

Olosuhdeseuranta

Asuntojen lkm, joissa optimi olosuhteet (<45 %, >20°C)	26
Asuntojen lkm, joissa kosteat olosuhteet, mutta lämmintä (>45 %, >20°C)	15
Asuntojen lkm, joissa liian kylmä (<20°C)	9
Asuntojen lkm, joista puuttuu mittaustulos viim. 7vrk sisään	11

Tuotannon yleisaikataulu

Ylätaso	Year Kuukausi Työvaihe	2022																				
		elokuu			syyskuu			lokakuu			marraskuu			joulukuu								
		31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
05_SV_0000 Sisäviheen valmistelu	TATE Asuntojen kaapelointi																					
	Etuputsi																					
07_KU_0000 Kuivat tilat	Väliseinien työpuoli																					
	TATE Väliseinien ja alakattojen peittoluvat																					
	Väliseinien tuplaus ja alakatot																					
	Tasoitus																					
	Maalaus																					
	Kalusteasennus																					
	TATE LVIS kalusteet ja päätelaitteet																					
	Parkettil-/Laminaattiasennus																					
	Oviasennus																					
	Listoitus																					
	Lukitus ja heloitus																					
	Kodinkoneasennus																					
	Varusteet																					
10_LU_0000 Luovutus	Loppusiivous 1: Pölyttömäksi siivous																					
	RU Itselleluovutus																					
	Itselleluovutuskorjaukset																					
	TATE Toimintakoe																					
	Loppusiivous 2 sis. lattiasuojien poisto																					
	Valvojan tarkastukset																					

Työmaan viikkopalaveri (viimeisin muistio: 22.9.2022)

Kysymys	ID	Henkilö	Status	Tilanne ja toimenpiteet
Ensi viikolla pidettävät - aloituspalaverit,	LA2	0 - Yhteinen	Vihreä	Congridin ja SiteDriven mukaisesti
- mestan luovutukset ja vastaanotot sekä		Työmaainsinööri Otto Liuhdo	Vihreä	
- mallikatselmuksset?		Työnjohtaja Juuso Tuhkanen	Vihreä	
- erityiset katselmuksset / mittaukset?		Työnjohtaja M.M.	Vihreä	
		Vastaava työnjohtaja Jari Leskinen	Vihreä	

Better flow and quality with real-time situation awareness

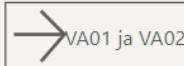
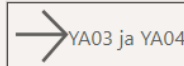
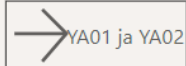
Process compliance (Production planning & control, quality control)

Näytettävät projektit

- 2007112 As Oy Vantaan Spinellipolku 3
- 2021310 As Oy Vantaan Syväkiventie 6
- 2021410 As Oy Vantaan Opaalikuja 2 (Kivitasku 1) (tuotanto)

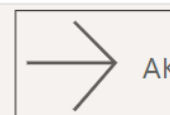
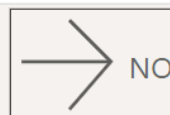
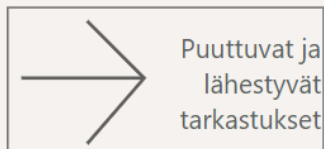
AIKATAULUNHALLINNAN DIGIKYPSYYSMALLI, MITTAUSJAKSO VIIM. 4 TÄYTTÄ VIIKKOA (10.10.2022 - 6.11.2022)

Projectcode_and_Name	YA01	YA02	YA03	YA04	VA01	VA02
2007112 As Oy Vantaan Spinellipolku 3	100 %	97 %	88 %	100 %	100 %	100 %
2021310 As Oy Vantaan Syväkiventie 6	100 %	100 %	100 %	100 %	75 %	55 %
2021410 As Oy Vantaan Opaalikuja 2 (Kivitasku 1) (tuotanto)	100 %	100 %	100 %	100 %	79 %	61 %
Yhteensä	100 %	99 %	100 %	100 %	83 %	68 %



LAADUNHALLINNAN DIGIKYPSYYSMALLI, MITTAUSJAKSO VIIM. 13 TÄYTTÄ VIIKKOA (8.8.2022 - 6.11.2022)

Projectcode_and_Name	SU02	SU03	SU04	NO02	NO03	NO04	NO05	AK01	AK02	AK03
2007112 As Oy Vantaan Spinellipolku 3	100 %	100 %	100 %	100 %		80 %	61 %	97 %	70 %	85 %
2021310 As Oy Vantaan Syväkiventie 6	97 %	85 %	100 %	100 %	100 %	83 %	89 %	87 %	87 %	96 %
2021410 As Oy Vantaan Opaalikuja 2 (Kivitasku 1) (tuotanto)	98 %	74 %	81 %	38 %	100 %	79 %	79 %	79 %	40 %	79 %
Yhteensä	99 %	85 %	92 %	69 %	100 %	80 %	73 %	87 %	61 %	85 %



YHTEENSÄ AIKATAULUNHALLINTA

Code	Mittari %
2007112	96 %
2021310	87 %
2021410	89 %
KA	91 %

YHTEENSÄ LAADUNHALLINTA

Code	Mittari %
2007112	87 %
2021310	92 %
2021410	73 %
KA	82 %



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