



TAKT PERFORMANCE INDICATORS

PAPER 135

BY

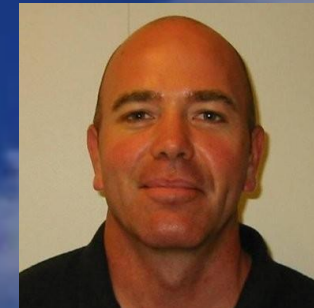
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INTRODUCTION



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INTRODUCTION

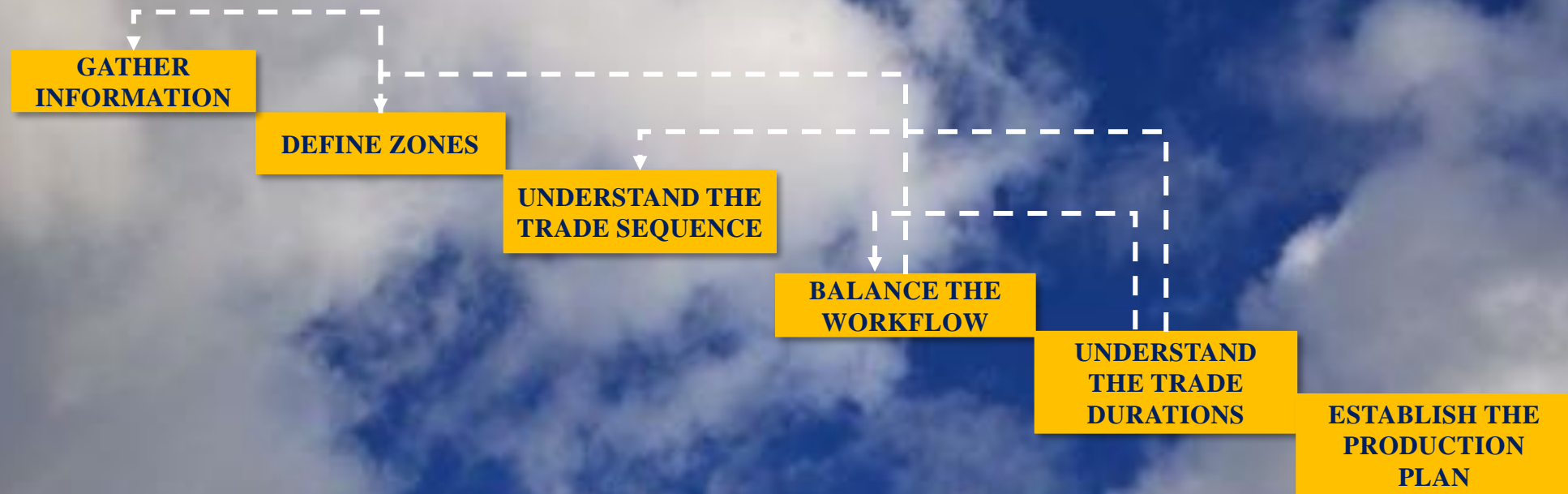


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- Interior activities: 10 different trades
- Takt planning team: carpentering, plumbing, ventilation, electricity, kitchen installation and painting
- 16 wagons



INTRODUCTION



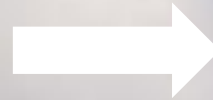
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PRELIMINARY CASE STUDY

- Practicing takt
- Mapped possible challenges during the takt planning and the takt plan execution
- Handle these challenges



PRIMARY CASE STUDY

1. What general challenges are expected during the takt plan execution?
2. Which takt performance indicators can identify these challenges?

METHOD



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Literature review

To understand takt and its evolution

Case study

Obtain data from an ongoing takt project

Document study

Obtain data from an ongoing takt project

Interviews

Strengthen the validity of the study

Measurements

Answer the second research question

MEASUREMENTS



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1. What challenges do we want to measure?
2. Where do we want to measure? (takt area)
3. How are we going to measure? (indicators)
4. When do we want to measure? (point of time)
5. Who shall be measured and who shall measure?

1. PPC
2. Perfect Handovers
3. Overtime
4. Returns
5. Additional choices
6. Man-hours
7. Staffing

Floor	Unit and zone	Zone cleaned?		Zone 100% completed?		Any returns this week?		All additional choices completed?		Executed within normal work-hours?		From trade	To trade
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Signature	Signature
			Comments?		What remains?	Reason?		Comments?					



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UNIT_ZONE- FLOOR	YEAR	WEEK	2019			2019			2019			2020			2020			2020			2020			2020			2020			2020			2020																				
			44	45	46	47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38				
1_3+2 - 1.floor			A	B/C	F/H	D	G/E				1	2	3	4	5	6	7	8	9	10	11	12	13		14	15	16																										
1_1 - 1.floor	RD		A	B/C	C/F	H	G/D	E				1	2	3	4	5	6	7	8	9	10	11	12		13	14	15	16																									
1_1 - 2.floor	RD		A	B/C	F	H	D				E	G	1	2	3	4	5	6	7	8	9	10	11		12	13	14	15																									
1_2 - 2.floor	RD		A	C	F	H	D				D	G	1	2	3	4	5	6	7	8	9	10	11		12	13	14	15	16																								
1_3 - 2.floor	RD		A	B/C	C	F					H	G/D	E	1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16																							
1_3 - 3.floor	RD		A	B	C						F	H	D	E	G	1	2	3	4	5	6	7	8		9	10	11	12	13	14	15	16																					
1_2 - 3.floor	RD		A	C							C	F	H	D	G	1	2	3	4	5	6	7		8	9	10	11	12	13	14	15	16																					
1_1 - 3.floor	RD		A	B							C	F	H	D	G	1	2	3	4	5	6	7		8	9	10	11	12	13	14	15	16																					
1_1 - 4.floor	RD		A								B	C	F	H	D	E	G	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16																			
1_2 - 4.floor	RD		A	C							A	C	F	H	D	G	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16																				
1_3 - 4.floor	RD		A	B	C						A	B	C	F	H	G/D	E	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16																			
1_3 - 5.floor			A	B							RD	A	B	C	F	H	D	E	G	1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16																	
1_2 - 5.floor	RD		A	C							RD	A	C	F	H	D	G	1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16																			
1_1 - 5.floor	RD		A	B	C						RD	A	B	C	F	H	G/D	E	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16																		
1_1 - 6.floor			A	B	C							RD	A	B	C	F	H	D	E	1	2	3		4	5	6	7	8	9	10	11	12	13	14	15	16																	
1_2 - 6.floor			A	B/C								RD	A	B/C	F	H	D	E	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16																		
1_3 - 6.floor			A	B	C							RD	A	B	C	F	H	D	E	1	2	3		4	5	6	7	8	9	10	11	12	13	14	15	16																	

- STEEL, INNER WALLS
- PLASTER, 1.ST LAYER
- VENTILATION DUCTS
- ELECTRICAL PLUMBING
- FIRE SPRINKLER + PRESSURE TEST
- PLASTER, CLOSE WALLS + CEILING

THEORETICAL FRAMEWORK



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TAKT

The required rate of production to meet the supply demand for that product.

TAKT PLANNING

Improve workflow in production

Adjustment mechanisms:

- Hybrid wagons
- Directional construction process
- Buffers
- Standardization
- Quality assurance

TAKT CONTROL

Record necessary changes to the takt plan



RESULTS – Takt plan components



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TAKT PLAN COMPONENTS	CHALLENGES	MEASURE TECHNIQUE: INDICATORS
1) GATHER INFORMATION	Inadequate and insufficiently detailed information	Protocol: Returns (4)
	Honesty within the man-hours estimate	Timesheets: Man-hours (6)
	Lack of manpower	Protocol/Timesheets: Overtime (3)
	Achieve steady staffing	Timesheets: Staffing (7)
4) BALANCE THE WORKFLOW	Illness	Timesheets: Staffing (7)

RESULTS – Takt plan components



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TAKT PLAN COMPONENTS	CHALLENGES	MEASURE TECHNIQUE: INDICATORS
5) UNDERSTAND THE TRADE DURATIONS	Delays	Protocol: PPC (1) + perfect handovers (2) + overtime (3) + returns(4)
	Illness	Timesheets: Staffing (7)
6) ESTABLISH THE PRODUCTION PLAN	Trades: Obtain control over the takt	Protocol: Perfect handovers (2)
	Project management: Obtain control over the takt	Protocol: Are the protocols filled out?

RESULTS – Adjustment mechanisms



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ADJUSTMENT MECHANISMS	CHALLENGES	MEASURE TECHNIQUE: INDICATORS
1) HYBRID WAGONS	Avoid different trades working in the same areas at the same time	Protocol: Returns (4)
2) DIRECTIONAL CONSTRUCTIVE PROCESS	A directional construction process should not provide buffer zones	Protocol: Returns (4)
3) BUFFER	The right number of buffers	No existing indicator
	Low priority on buffer-work	Timesheets: Staffing (7)
4) STANDARDIZATION	Less variation in the work tasks	Timesheets: Staffing (7)
5) QUALITY ASSURANCE	Good communication within the project	Protocols: Do every trade sign?
	Forget an additional choice	Protocol: Additional choices (5)

RESULTS- Handover protocol



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	1) Steel, Inner walls	2) Plaster, 1.st layer	3) Electrical plumbing	4) Ventilation ducts	5) Fire sprinkler + Pressure test	6) Plaster, Close walls + Ceiling
Week 4	1_2	2_3	3_4	4_5		
Week 5	1_2	2_3	3_4	4_5	5_6	
Week 6	1_2	2_3	3_4	4_5	5_6	
Week 7	1_2	2_3	3_4	4_5	5_6	6_7
Week 8	1_2	2_3	3_4	4_5	5_6	6_7
Week 9	1_2	2_3	3_4	4_5	5_6	6_7
Week 10	1_2	2_3	3_4	4_5	5_6	6_7
Week 11	1_2	2_3	3_4	4_5	5_6	6_7
Week 12	1_2	2_3	3_4	4_5	5_6	6_7
Week 13	1_2	2_3	3_4	4_5	5_6	6_7
Week 14	1_2	2_3	3_4	4_5	5_6	6_7
Week 15						
Week 16	1_2	2_3	3_4	4_5	5_6	6_7
Week 17	1_2	2_3	3_4	4_6		6_7
Week 18	1_2	2_3	3_4	4_6		6_7

No protocol was filled out

Handover conducted before planned progress or with delay

Handover conducted according to plan

Protocol lacking a signature

DISSCUSSION



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- Follow-ups and personal support

PROTOCOL:

2. Perfect handover
3. Overtime
4. Returns
5. Additional choices

TIMESHEETS:

6. Man-hours
7. Staffing

MANUAL MEASUREMENT?

1. PPC

CONCLUDING REMARKS



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16 CHALLENGES

7 INDICATORS

**GATHER
INFORMATION**

DEFINE ZONES

**UNDERSTAND THE
TRADE SEQUENCE**

**BALANCE THE
WORKFLOW**

**UNDERSTAND
THE TRADE
DURATIONS**

**ESTABLISH THE
PRODUCTION
PLAN**

1. Hybrid wagons
2. Directional construction process
3. Buffers
4. Standardization
5. Quality assurance

1. PPC
2. Perfect Handovers
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