

MKT CHEESE PLATFORM

CyberFactory#1 Results Webinar in Finland

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High Metal Oy in brief

- Family business founded in 1949
- Turnover 2020 7,5M€
- Personnel 40
- Factory located in Vantaa
- Three business lines:
 - MKT Dairy products (since 2014)
 - Customer solutions (stainless steel)
 - Swimming pool solutions (since 2018)
- R&D, engineering, production, after-sales









Content

- Challenges in Cheese Making
- MKT Cheese Platform concept
- Added Value



Challenges in industrial cheese making

- Batch process production
- Waste during the product change in production
- Product volume changes
- Cheese size variabilities
- Shattered production Data and utilization
- Equipment life cycle
- Production facility footprint



MKT Cheese Platform – concept 1/2

New Platform Cheese Factory Concept

1. Milk in

2. Cheese vat

3. Moulding

4. Pressing

5. Removing cheese from moulds

6. Conveyor to brining

Technologies can be utilized

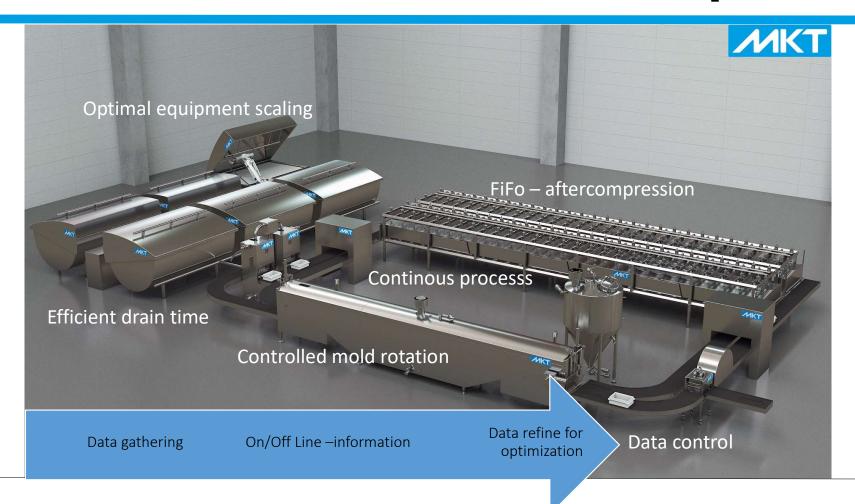
- 1) Robot for cheese vat operation
- 2. Electrical tomography based measurement for curd/whey ratio
- 3) Machine vision used for cheese quality verification
- IoT, analytics and cyber security for overall process control and security (e.g. remote connections)



Scalable solution for production increase

Confidential

MKT Cheese Platform – concept 2/2





Production simulation

MKT simulation benefits:

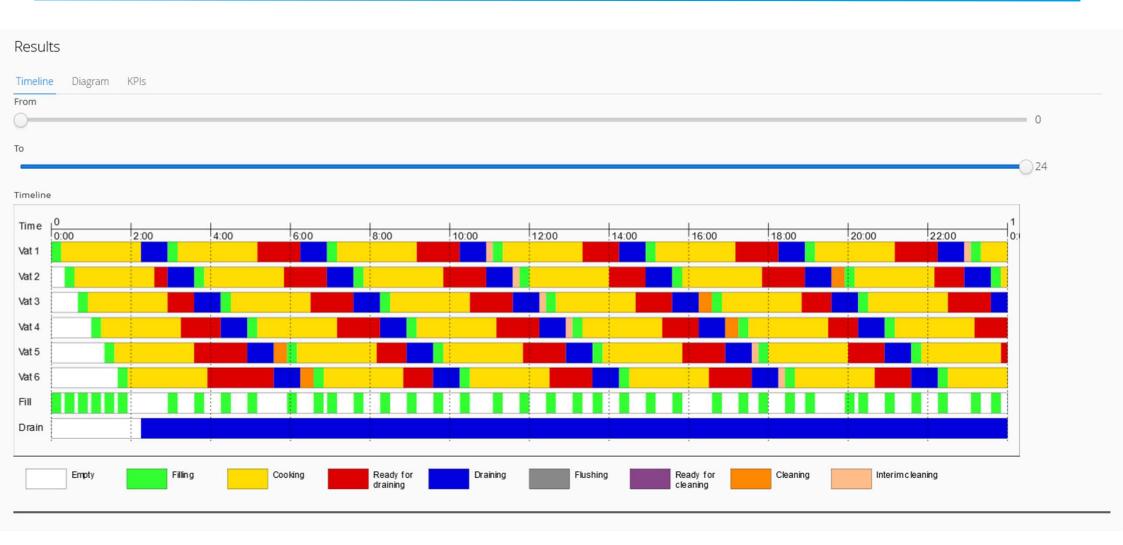
- 1. Optimum equipment size
- 2. Modelling continuous cheese making production
- 3. Verify KPI in advance
- 4. Equipment life cycle optimisation and prolonging equipment age
- 5. Step to Digital production modelling (digital twin)



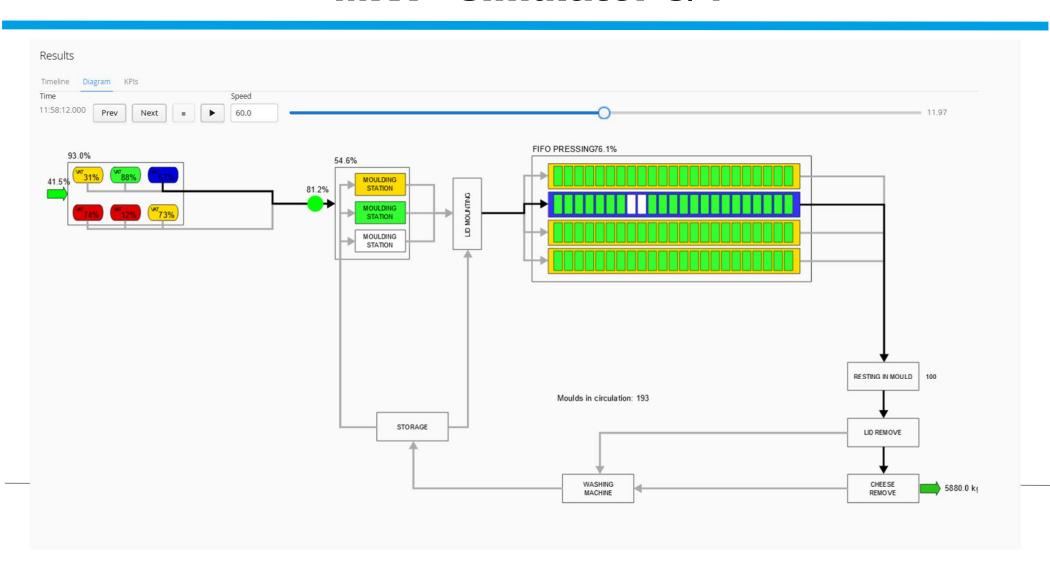
MKT -simulator 1/4

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MKT -simulator 2/4



MKT -simulator 3/4



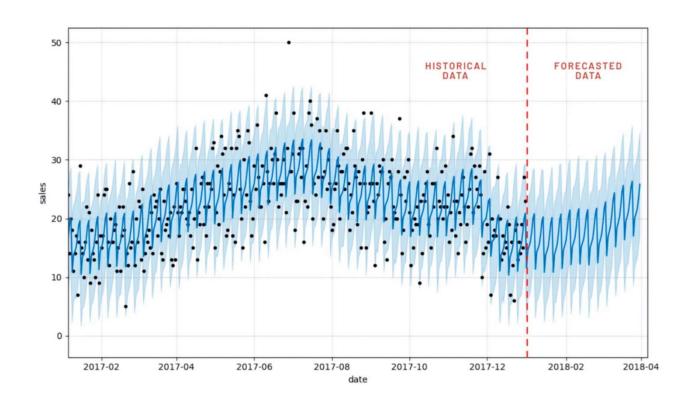
MKT -simulator 4/4

1. Utilization rates	2. Quantities	3. Time values	4. Equipment	Reporting
Filling utilization rate 39.6%	Total production (pcs)	Average vat draining time (min) 38.4	Number of vats	Generate Excel Report
Vat utilization rate 76.6%	Total production quantity 16710.0 kg	In-mould time (min), min / avg / max 192.0 / 192.0 / 192.0	Vat capacity (I) 6000.0	
Draining utilization rate	Hourly production rate 900.81 kg/h	In-vat time (min), min / avg / max 120.0 / 196.5 / 259.0	Number of moulding stations	
Moulding station utilization rate 67.0%	Daily production rate 21619.4 kg/d	Total time (min), min / avg / max 312.0 / 388.8 / 451.0	Number of pressing lines	
Press utilization rate 100.0%	Yearly production rate 7134.4 t/a		Number of moulds per pressing line 23	
			Filling pump rate (I/min) 400.0	
			Draining pump rate (I/min) 150.0	
			Maximum moulds in circulation	

Machine learning

Using machine learning we can:

- Predict coming events using data
- Optimize performance and recipe
- We can predict possible production interference to product quality
- Enable predective maintenance





MKT -technology added value

- Correct capacity size design is a key for flexible production
 - Optimize investment and efficiency (ROI)
- Minimize product losses (Batch / continuous process management)
 - Product change losses during the batch change 0-1 cheese block , > annual savings xxx kg/€
- Machine learning maximize quality and yield up to 1-2% (basic data, steering data, results). Find the most efficience output.
 - Daily time saving about 2 h with help of new moulding technology innovation.
 Time *€ (40min->20 min/ batch handling time)
- Real equal production quality using curd one time cutting, weight control & FIFo pressing principle





THANK YOU

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THE HIGHEST STANDARD OF CHEESE MAKING EQUIPMENT