DDMRP World 2019
MANN+HUMMEL Our Journey with DDMRP in Speyer

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11.10.2019

Demand Driven Supply Chain

MANN+HUMMEL

AGENDA

I. MANN + HUMMEL

II. PLANT SPEYER

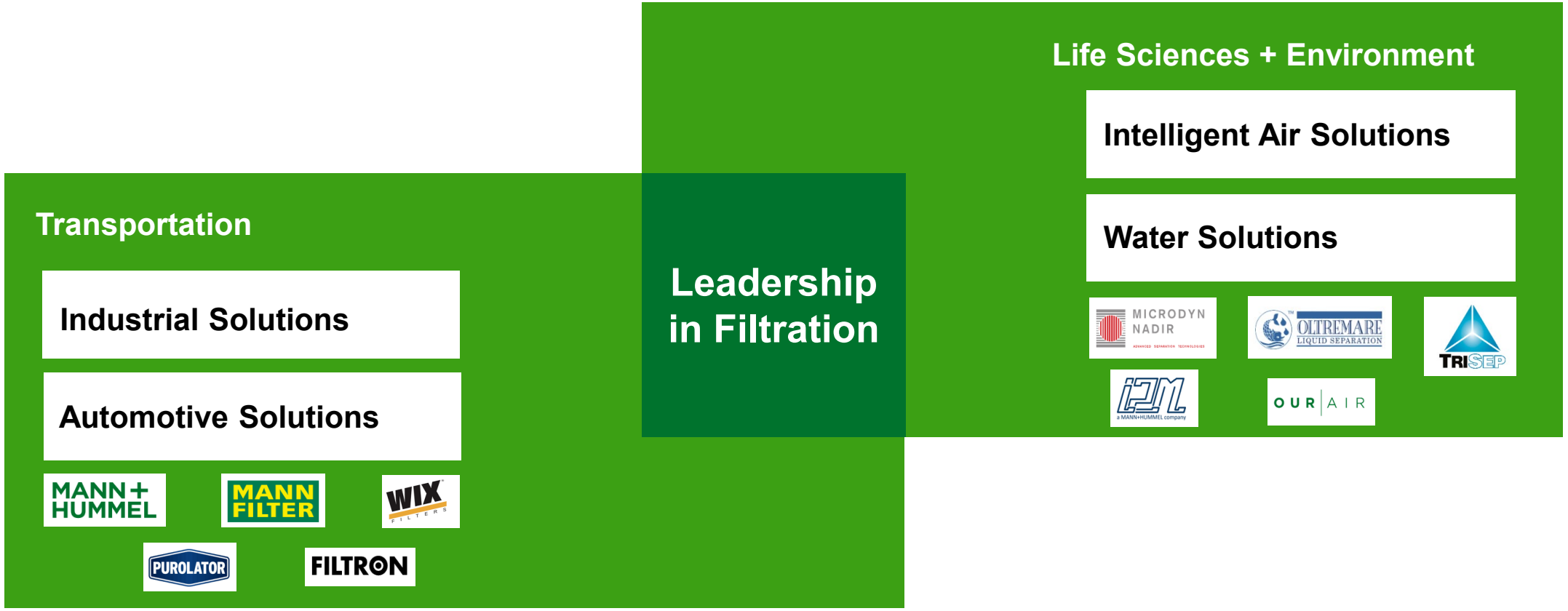
III. ROADMAP TO DDMRP

IV. MAKE IT HAPPEN

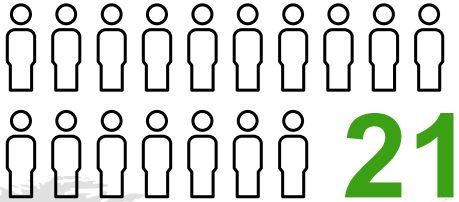
V. FIRST RESULTS

VI. WE NEED TO CONTINUE

I. MANN+HUMMEL
SEPARATE THE USEFUL FROM THE HARMFUL



I. MANN+HUMMEL
OUR FUTURE IS GREEN



Employees
21,000

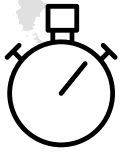
Top **50**
patent applicants
in Germany

different products
73,000

Founded in
1941

80 locations worldwide
in 5 continents

Sales in
billion €
3.95



26 filters per
second

3,000 patents
and applications

II. PLANT SPEYER
LOW VOLUME – HIGH MIX

Facts:

- **Number of employees: 475**
- Total area: 88.025 m²
- Developable area: 26.650 m²

Complexity:

- 50,000 materials and components
- 10,000 finished products

Storage:

- 8,350 pal. places in plant
- 7,500 pal. places in fully automat. high rack
- 6,900 pal. places in xt. warehouses

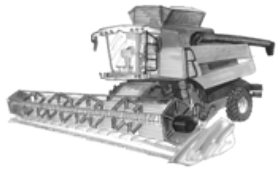
Inbound:

- 28,000 goods receipt p. a.
- 500 consignments per day
- 21 trucks per day

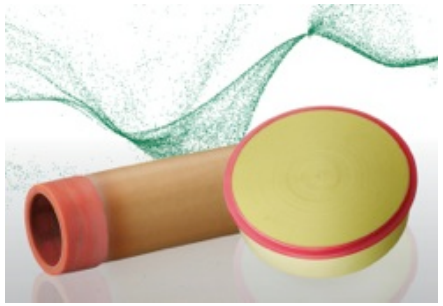
Outbound:

- 89,000 positions p. a.
- 171,000 consigments p. a.
- 25 trucks per day

II. PLANT SPEYER
LOW VOLUME – HIGH MIX



Airfilters



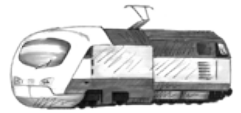
Airfilter elements

Special filters

Air/oil separators

Crankcase ventilation

Erosion filters



III. ROADMAP TO DDMRP
CHALLENGING TARGETS – EXPECT WHAT YOU INSPECT

Inventories

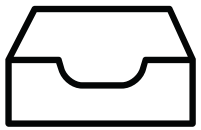
-20%

Inventory reduction for DDMRP planned materials.

Stockouts

-50%

Increase availability of DDMRP planned materials by reducing stock-out-events.



Market Lead Time

-80%

Reduction of lead time for DDMRP planned materials by decoupling and buffering.

III. ROADMAP TO DDMRP
OUR EVOLUTION – STEP BY STEP

February 2017

Start pilot project
purchasing components for one production line

November 2017

GoLive MTS/MTO
control with DDMRP in MATERIAL PLANNING of finished products

December 2017

Investigation of integrated solution in SAP
evaluation of solutions of SAP and others.

March 2018

Start of project with SAP ECC
DDMRP solution without any additional interfaces for DDMRP method directly in SAP Core

June 2018

Successful pilot project completion
preparation of lessons learned about DDMRP project

July 2018

Start implementation SAP ECC DDMRP
implementation in plant Speyer for planning and procurement of components

DDMRP in SAP Core

III. ROADMAP TO DDMRP
IMPLEMENTATION IN SAP CORE

Start of implementation July 2018

Nov 2018

GoLive I

DDMRP basic process

GoLive II

DDMRP advanced process

March 2019

Apr 2019

Ramp Up SAP Solution

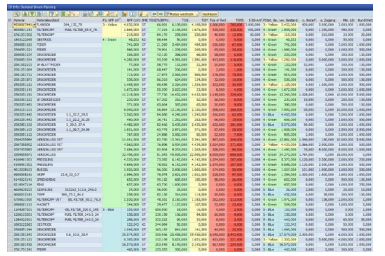
Update of Release 2019

Introduction of function extension

DDMRP delivery schedule forecast

May 2019

Current status



September 2019

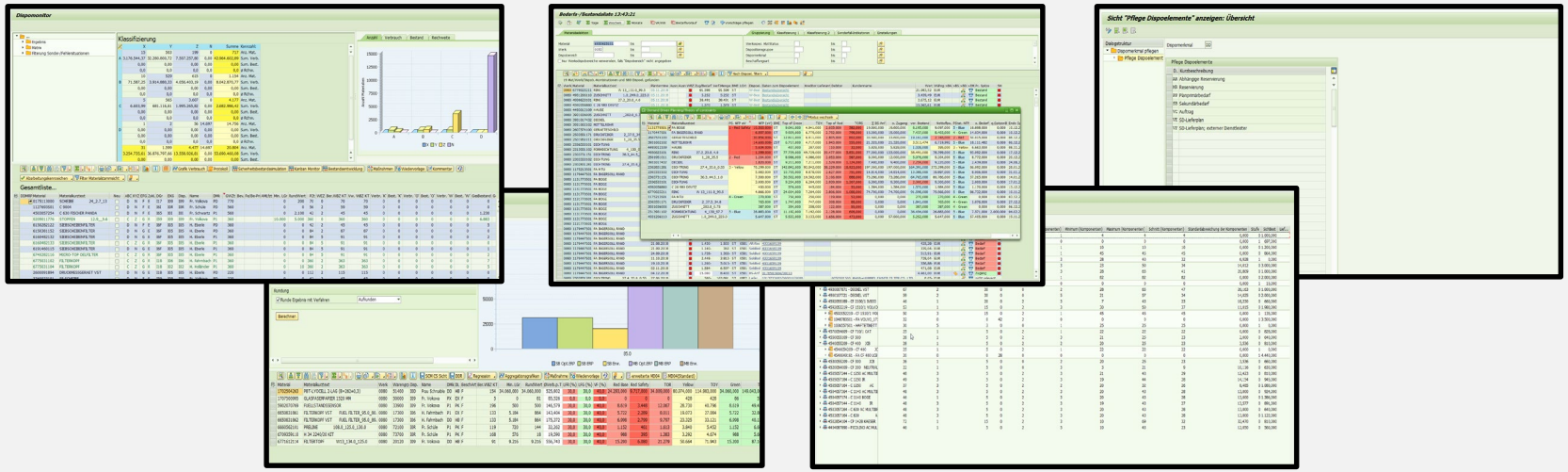
Planning of 500 material numbers with DDMRP

Orders and delivery schedule

End of project November 2019

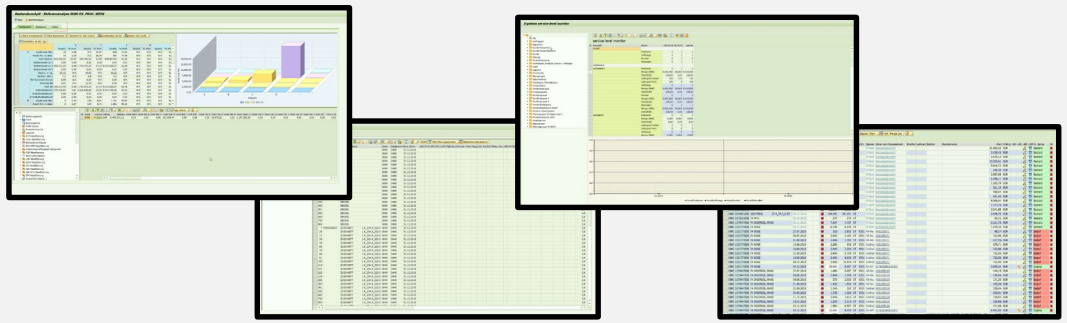
IV. MAKE IT HAPPEN
EXTENDED TOOLS IN SAP

Basic
DDMRP process



- MRP-Monitor
- Stocking Level Monitor
- Advanced MD04
- Simulations Safety Stock and DDP Buffers
- Replenishment Leadtime Monitor
- Customized MRP-type

Advanced
DDMRP optimization



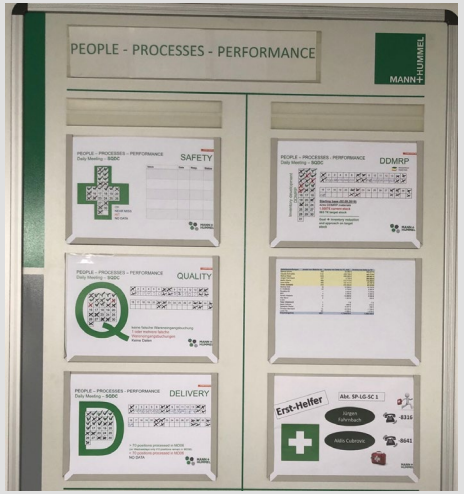
- Exception Monitor
- Inventory Controlling Cockpit
- Material Simulation Cockpit
- Service Level Cockpit

IV. MAKE IT HAPPEN
POWER IS NOTHING WHITHOUT CONTROL

Daily Management → **Order Requirement** → **Exceptions (review buffer status)** → **Daily Inventory Tracking**

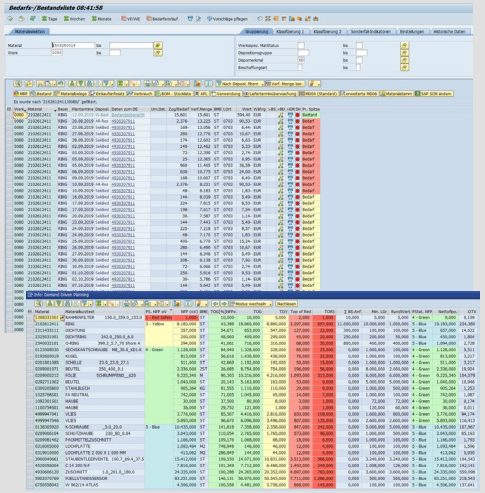
SQDC

- Safety, quality, delivery and cost
- Procurement and production planning



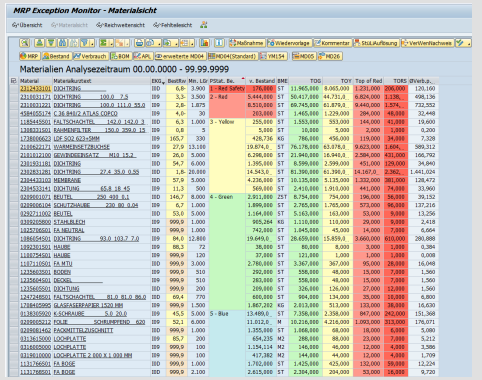
SAP Advanced MD04

- Check ordering suggestions
- Implement ordering requirements



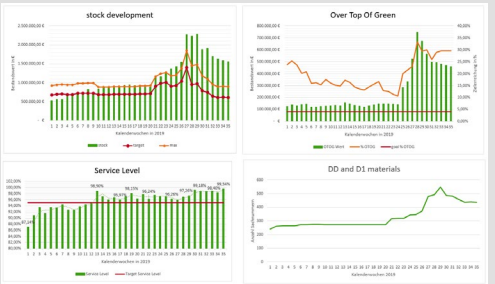
SAP Exception Monitor

- Reason? Short time customer disposition, delays, …
- Solution and measure? Raise and prefer orderings

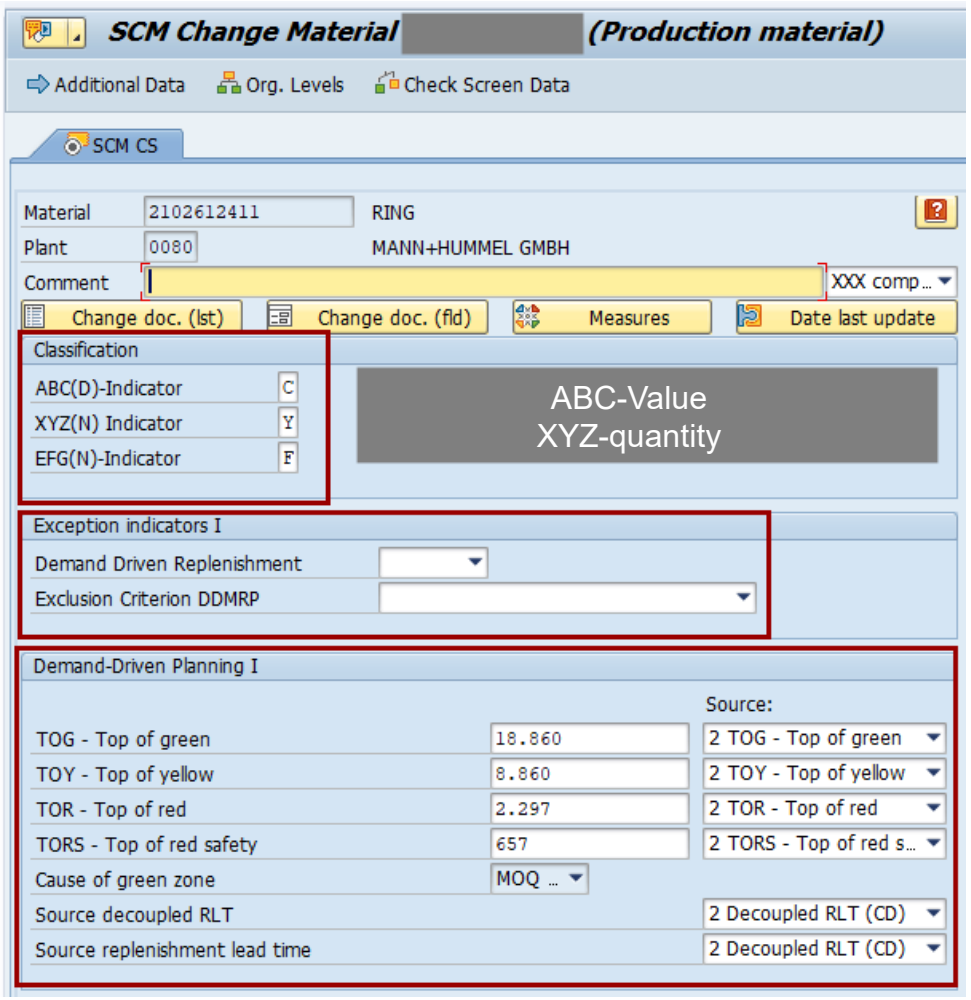


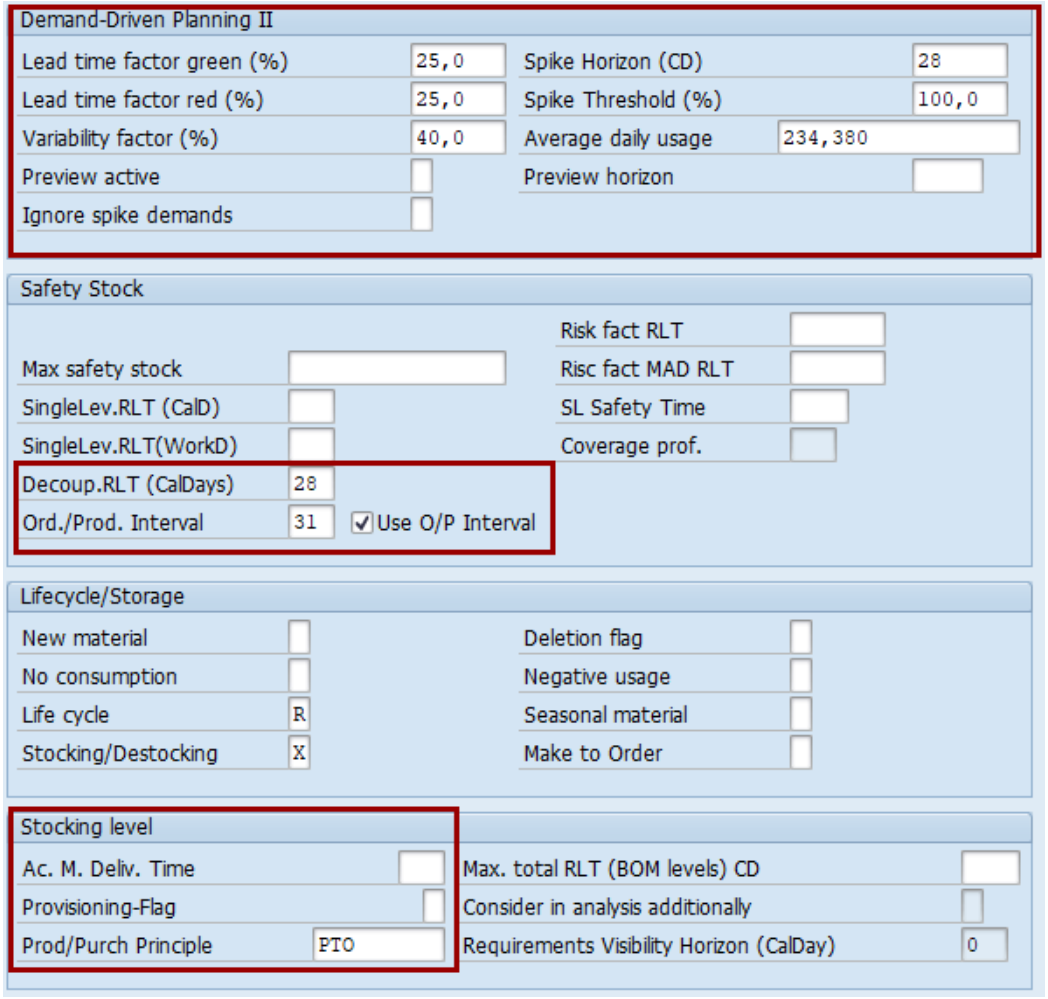
Visualization

- Stock development
- Overstock
- Goods in receipt
- Service level



IV. MAKE IT HAPPEN
OUR MONTHLY BUSINESS – MATERIAL MASTER VIEW





All DDMRP material data are maintained on a separate SAP CS view.

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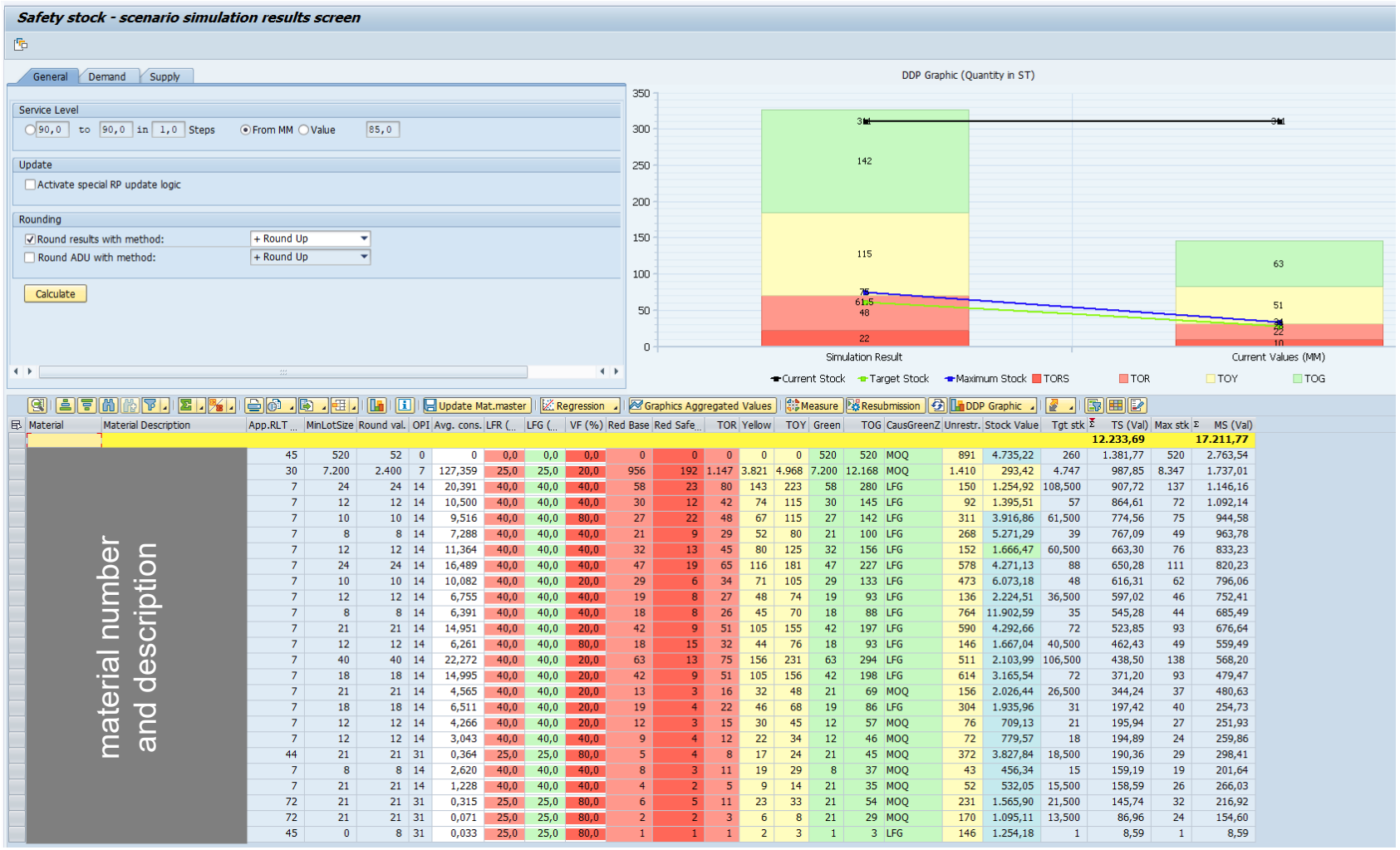
IV. MAKE IT HAPPEN

OUR MONTHLY/WEEKLY BUSINESS – Simulations Safety Stock and DDP Buffers



Material	Material Description	App.RLT ...	MinLotSize	Round val.	OPI	Avg. cons.	LFR (...	LFG (...	VF (%)	Red Base	Red Safe...	TOR	Yellow	TOY	Green	TOG	CausGreenZ	Unrestr.	Stock Value	Tgt stk	TS (Val)	Max stk	MS (Val)
																					12.233,69		17.211,77
		45	520	52	0	0	0,0	0,0	0,0	0	0	0	0	0	520	520	MOQ	891	4.735,22	260	1.381,77	520	2.763,54
		30	7.200	2.400	7	127,359	25,0	25,0	20,0	956	192	1.147	3.821	4.968	7.200	12.168	MOQ	1.410	293,42	4.747	987,85	8.347	1.737,01
		7	24	24	14	20,391	40,0	40,0	40,0	58	23	80	143	223	58	280	LFG	150	1.254,92	108,500	907,72	137	1.146,16
		7	12	12	14	10,500	40,0	40,0	40,0	30	12	42	74	115	30	145	LFG	92	1.395,51	57	864,61	72	1.092,14
		7	10	10	14	9,516	40,0	40,0	80,0	27	22	48	67	115	27	142	LFG	311	3.916,86	61,500	774,56	75	944,58
		7	8	8	14	7,288	40,0	40,0	40,0	21	9	29	52	80	21	100	LFG	268	5.271,29	39	767,09	49	963,78
		7	12	12	14	11,364	40,0	40,0	40,0	32	13	45	80	125	32	156	LFG	152	1.666,47	60,500	663,30	76	833,23
		7	24	24	14	16,489	40,0	40,0	40,0	47	19	65	116	181	47	227	LFG	578	4.271,13	88	650,28	111	820,23
		7	10	10	14	10,082	40,0	40,0	20,0	29	6	34	71	105	29	133	LFG	473	6.073,18	48	616,31	62	796,06
		7	12	12	14	6,755	40,0	40,0	40,0	19	8	27	48	74	19	93	LFG	136	2.224,51	36,500	597,02	46	752,41
		7	8	8	14	6,391	40,0	40,0	40,0	18	8	26	45	70	18	88	LFG	764	11.902,59	35	545,28	44	685,49
		7	21	21	14	14,951	40,0	40,0	20,0	42	9	51	105	155	42	197	LFG	590	4.292,66	72	523,85	93	676,64
		7	12	12	14	6,261	40,0	40,0	80,0	18	15	32	44	76	18	93	LFG	146	1.667,04	40,500	462,43	49	559,49
		7	40	40	14	22,272	40,0	40,0	20,0	63	13	75	156	231	63	294	LFG	511	2.103,99	106,500	438,50	138	568,20
		7	18	18	14	14,995	40,0	40,0	20,0	42	9	51	105	156	42	198	LFG	614	3.165,54	72	371,20	93	479,47
		7	21	21	14	4,565	40,0	40,0	20,0	13	3	16	32	48	21	69	MOQ	156	2.026,44	26,500	344,24	37	480,63
		7	18	18	14	6,511	40,0	40,0	20,0	19	4	22	46	68	19	86	LFG	304	1.935,96	31	197,42	40	254,73
		7	12	12	14	4,266	40,0	40,0	20,0	12	3	15	30	45	12	57	MOQ	76	709,13	21	195,94	27	251,93
		7	12	12	14	3,043	40,0	40,0	40,0	9	4	12	22	34	12	46	MOQ	72	779,57	18	194,89	24	259,86
		44	21	21	31	0,364	25,0	25,0	80,0	5	4	8	17	24	21	45	MOQ	372	3.827,84	18,500	190,36	29	298,41
		7	8	8	14	2,620	40,0	40,0	40,0	8	3	11	19	29	8	37	MOQ	43	456,34	15	159,19	19	201,64
		7	21	21	14	1,228	40,0	40,0	40,0	4	2	5	9	14	21	35	MOQ	52	532,05	15,500	158,59	26	266,03
		72	21	21	31	0,315	25,0	25,0	80,0	6	5	11	23	33	21	54	MOQ	231	1.565,90	21,500	145,74	32	216,92
		72	21	21	31	0,071	25,0	25,0	80,0	2	2	3	6	8	21	29	MOQ	170	1.095,11	13,500	86,96	24	154,60
		45	0	8	31	0,033	25,0	25,0	80,0	1	1	1	2	3	1	3	LFG	146	1.254,18	1	8,59	1	8,59

DDMRP Simulation Cockpit

- Monthly automatic buffer calculation with SAP Job
- Possibility to simulate all DDMRP parameters for new buffer sizing (lead time and variability factor, order cycle, MOQ, lead time, etc.)
- Cause for green zone
- Graphic display and comparison

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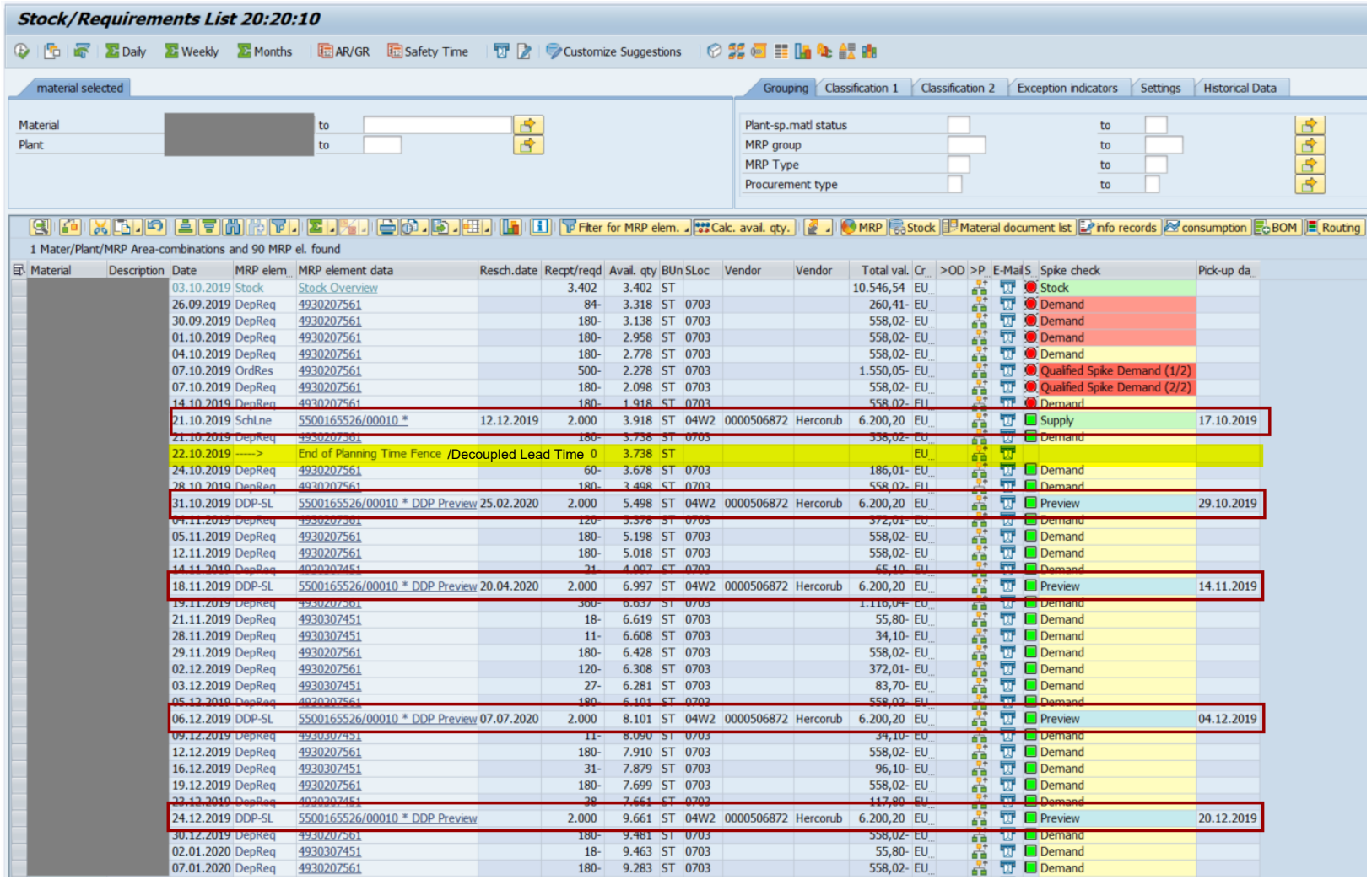
IV. MAKE IT HAPPEN

OUR WEEKLY BUSINESS – ADVANCED MD04 / Supplier Preview



Functionality DDMRP with scheduling agreement

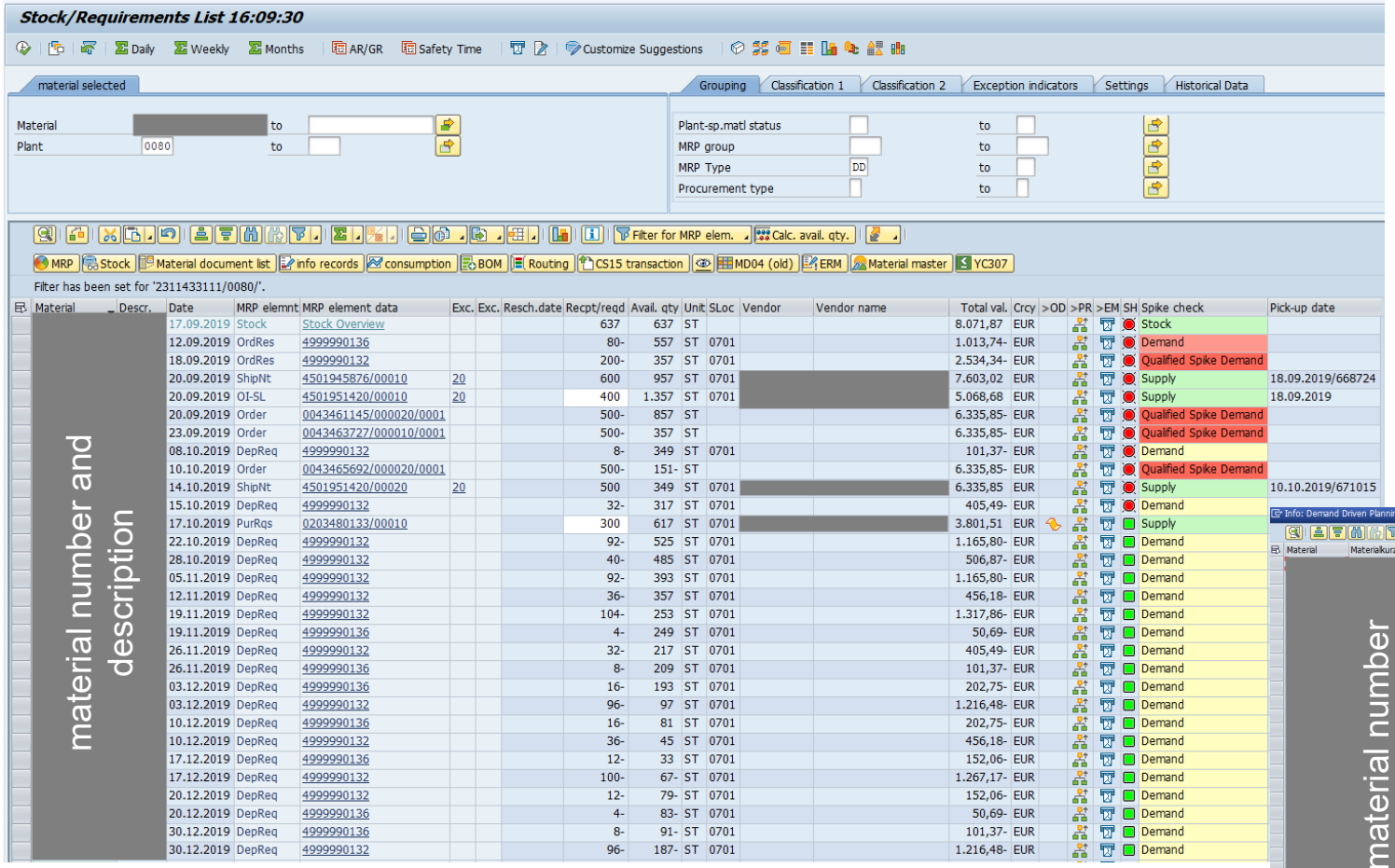
If the Netflow is under TOY - Top of yellow, the system generates a delivery schedule automatically at the end of the Decoupled Lead Time

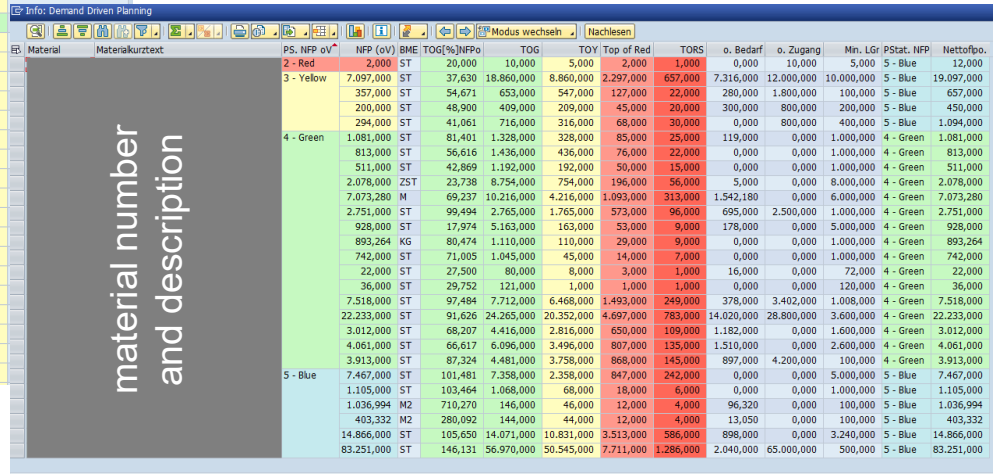
After this the system takes the current Netflow and the ADU and simulates the next delivery schedule as a preview for the supplier.

MANN+HUMMEL

IV. MAKE IT HAPPEN

OUR DAILY BUSINESS – ADVANCED MD04

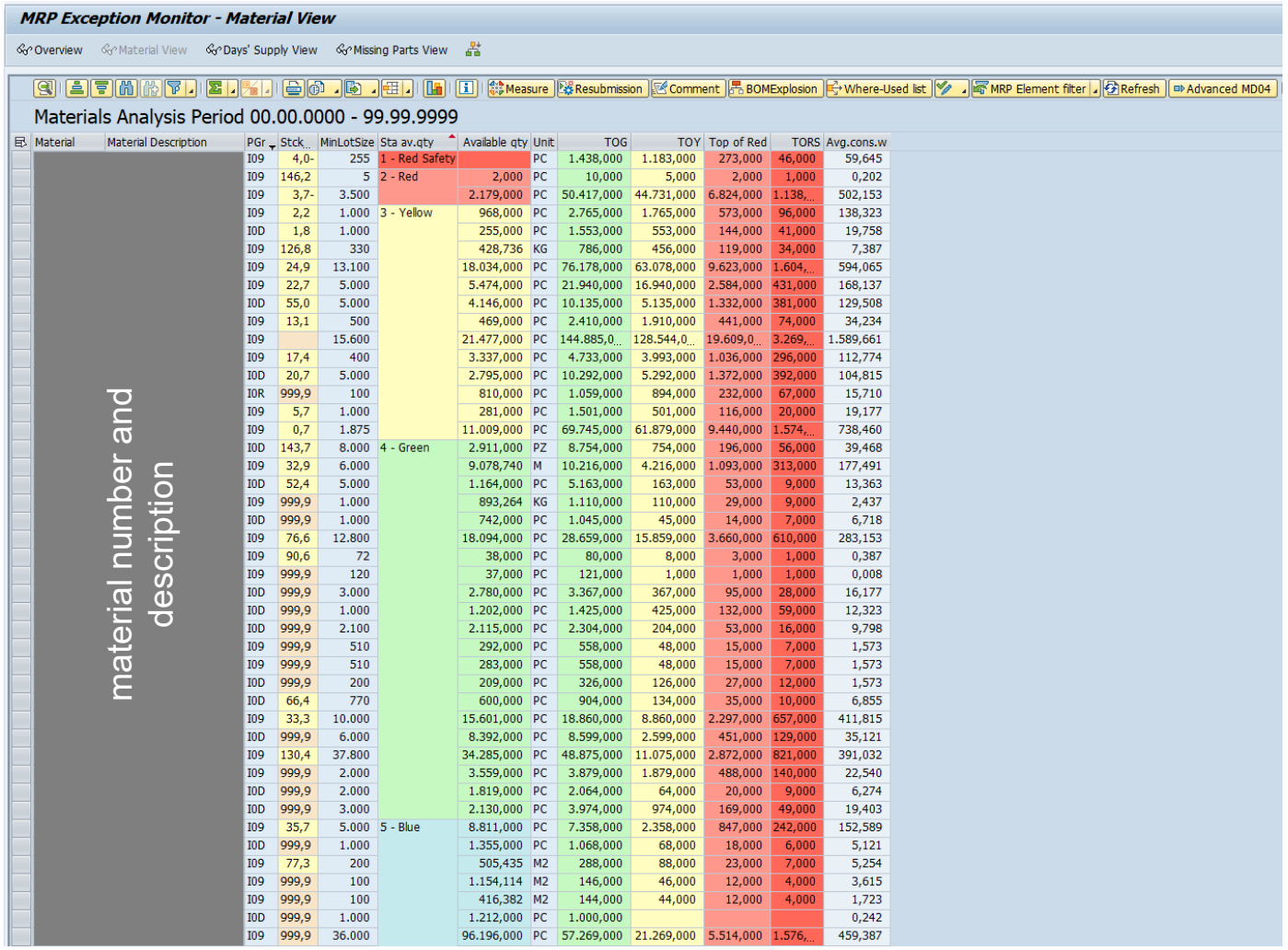




Daily DDMRP ordering process

SAP generates ordering suggestions automatically and the user has to convert them into orders.

IV. MAKE IT HAPPEN
OUR DAILY BUSINESS – EXCEPTION MONITOR



Material	Material Description	PGr	Stck..	MinLotSize	Sta av.qty	Available qty	Unit	TOG	TOY	Top of Red	TORS	Avg.cons.w
		I09	4,0-	255	1 - Red Safety		PC	1.438,000	1.183,000	273,000	46,000	59,645
		I09	146,2	5	2 - Red	2,000	PC	10,000	5,000	2,000	1,000	0,202
		I09	3,7-	3.500		2.179,000	PC	50.417,000	44.731,000	6.824,000	1.138,..	502,153
		I09	2,2	1.000	3 - Yellow	968,000	PC	2.765,000	1.765,000	573,000	96,000	138,323
		I0D	1,8	1.000		255,000	PC	1.553,000	553,000	144,000	41,000	19,758
		I09	126,8	330		428,736	KG	786,000	456,000	119,000	34,000	7,387
		I09	24,9	13.100		18.034,000	PC	76.178,000	63.078,000	9.623,000	1.604,..	594,065
		I09	22,7	5.000		5.474,000	PC	21.940,000	16.940,000	2.584,000	431,000	168,137
		I0D	55,0	5.000		4.146,000	PC	10.135,000	5.135,000	1.332,000	381,000	129,508
		I09	13,1	500		469,000	PC	2.410,000	1.910,000	441,000	74,000	34,234
		I09		15.600		21.477,000	PC	144.885,0..	128.544,0..	19.609,0..	3.269,..	1.589,661
		I09	17,4	400		3.337,000	PC	4.733,000	3.993,000	1.036,000	296,000	112,774
		I0D	20,7	5.000		2.795,000	PC	10.292,000	5.292,000	1.372,000	392,000	104,815
		I0R	999,9	100		810,000	PC	1.059,000	894,000	232,000	67,000	15,710
		I09	5,7	1.000		281,000	PC	1.501,000	501,000	116,000	20,000	19,177
		I09	0,7	1.875		11.009,000	PC	69.745,000	61.879,000	9.440,000	1.574,..	738,460
		I0D	143,7	8.000	4 - Green	2.911,000	PZ	8.754,000	754,000	196,000	56,000	39,468
		I09	32,9	6.000		9.078,740	M	10.216,000	4.216,000	1.093,000	313,000	177,491
		I0D	52,4	5.000		1.164,000	PC	5.163,000	163,000	53,000	9,000	13,363
		I09	999,9	1.000		893,264	KG	1.110,000	110,000	29,000	9,000	2,437
		I0D	999,9	1.000		742,000	PC	1.045,000	45,000	14,000	7,000	6,718
		I09	76,6	12.800		18.094,000	PC	28.659,000	15.859,000	3.660,000	610,000	283,153
		I09	90,6	72		38,000	PC	80,000	8,000	3,000	1,000	0,387
		I09	999,9	120		37,000	PC	121,000	1,000	1,000	1,000	0,008
		I0D	999,9	3.000		2.780,000	PC	3.367,000	367,000	95,000	28,000	16,177
		I0D	999,9	1.000		1.202,000	PC	1.425,000	425,000	132,000	59,000	12,323
		I0D	999,9	2.100		2.115,000	PC	2.304,000	204,000	53,000	16,000	9,798
		I09	999,9	510		292,000	PC	558,000	48,000	15,000	7,000	1,573
		I09	999,9	510		283,000	PC	558,000	48,000	15,000	7,000	1,573
		I0D	999,9	200		209,000	PC	326,000	126,000	27,000	12,000	1,573
		I0D	66,4	770		600,000	PC	904,000	134,000	35,000	10,000	6,855
		I09	33,3	10.000		15.601,000	PC	18.860,000	8.860,000	2.297,000	657,000	411,815
		I0D	999,9	6.000		8.392,000	PC	8.599,000	2.599,000	451,000	129,000	35,121
		I09	130,4	37.800		34.285,000	PC	48.875,000	11.075,000	2.872,000	821,000	391,032
		I09	999,9	2.000		3.559,000	PC	3.879,000	1.879,000	488,000	140,000	22,540
		I0D	999,9	2.000		1.819,000	PC	2.064,000	64,000	20,000	9,000	6,274
		I0D	999,9	3.000		2.130,000	PC	3.974,000	974,000	169,000	49,000	19,403
		I09	35,7	5.000	5 - Blue	8.811,000	PC	7.358,000	2.358,000	847,000	242,000	152,589
		I0D	999,9	1.000		1.355,000	PC	1.068,000	68,000	18,000	6,000	5,121
		I09	77,3	200		505,435	M2	288,000	88,000	23,000	7,000	5,254
		I09	999,9	100		1.154,114	M2	146,000	46,000	12,000	4,000	3,615
		I09	999,9	100		416,382	M2	144,000	44,000	12,000	4,000	1,723
		I0D	999,9	1.000		1.212,000	PC	1.000,000				0,242
		I09	999,9	36.000		96.196,000	PC	57.269,000	21.269,000	5.514,000	1.576,..	459,387

Daily control buffer status
What is the buffer size of the available stock?

- **Red** safety zone
- **Yellow** in order (transit)
- **Green** good stock
- **Blue** overstock

➔ Next steps and measures!

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V. FIRST RESULTS
CURRENT STATUS

Inventories

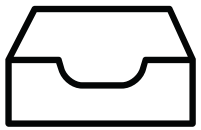
-29%

Inventory reduction for DDMRP planned materials.

Stockouts

-92%

Increase availability of DDMRP planned materials by reducing stock-out-events.



Market Lead Time

-50%

Reduction of lead time for DDMRP planned materials by decoupling and buffering.

VI. WE NEED TO CONTINUE
NEXT STEPS

November 2019

- Implementation M+H requirements and first positive effects

December 2019 – January 2020

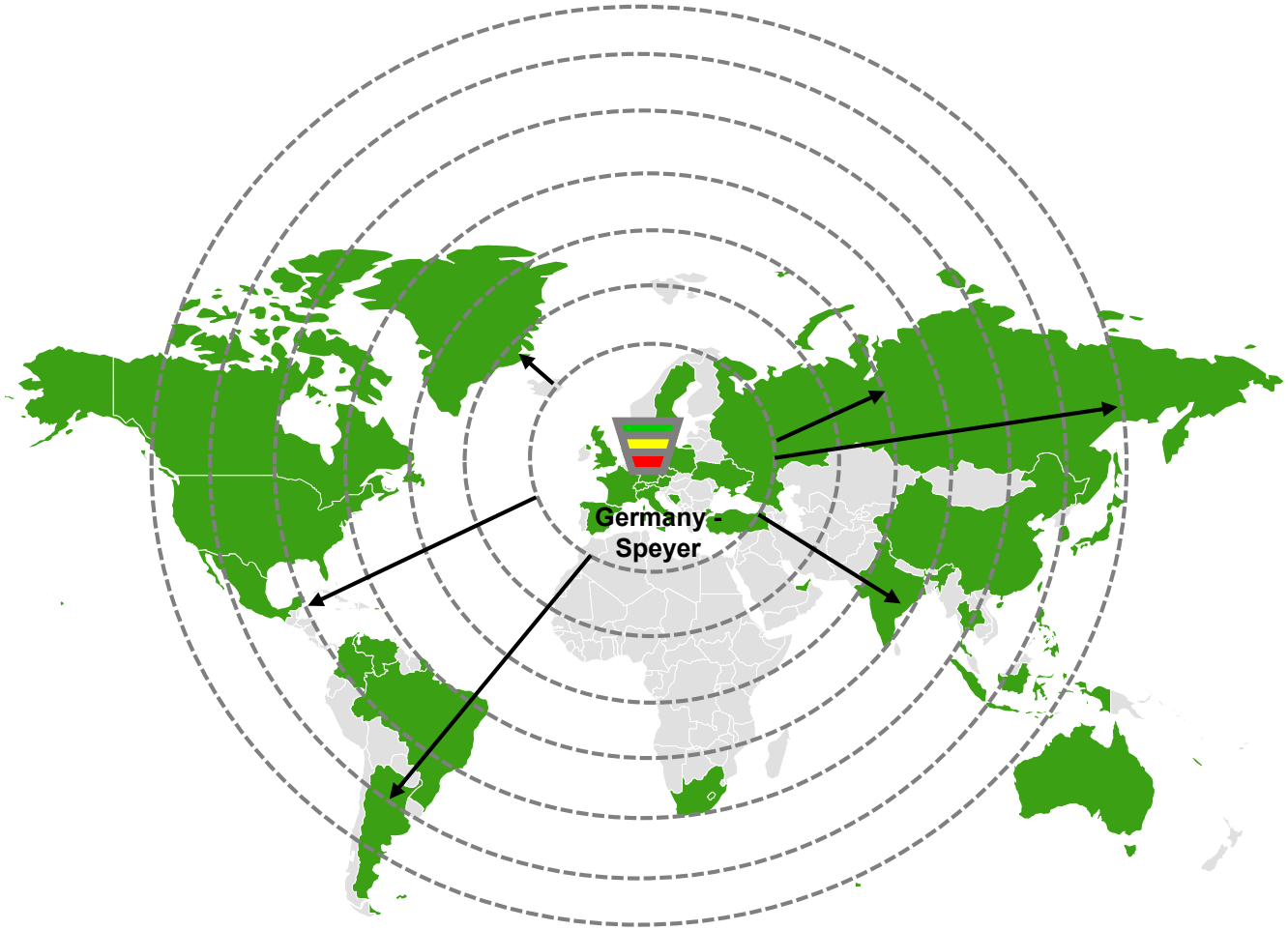
- SAP integration in production planning and scheduling

February 2020

- Start DDMRP introduction for SEMI and FINISH-parts

December 2020

- Consistent DDMRP planning of all BOM levels



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Thank you for your attention.
Questions?

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