Lessons learnt in Implementing Make-to-Availability (MTA) and Distribute-to-Availability (DTA)

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Oded has authored multiple TOC articles and contributed to numerous TOC books.

Oded in the is the author of *Ever Improve – A Guide to Managing Production the TOC Way*, published in June 2010. Oded co-authored the book *Deming & Goldratt: The Theory of Constraints and the System of Profound Knowledge – The Decalogue.*

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Structure

1. Supply Chain Management the TOC Way – MTA and DTA – key injections
2. The technical implementation
3. Issues to be considered for the implementation
4. The role of the pilot
5. Outcomes of the pilot
6. NBRs and how to address them
7. More practical lessons
8. What happens if we skip the pilot?

Introduction

The TOC solution for managing Supply Chain contains MTA for the manufacturer and DTA for the downstream chain bringing the goods from the manufacturer all the way to the end user/consumer. Both MTA and DTA solutions are conceptually simple, practical and technically straight forward.

Yet, the change in the flow and in managing the flow is challenging.

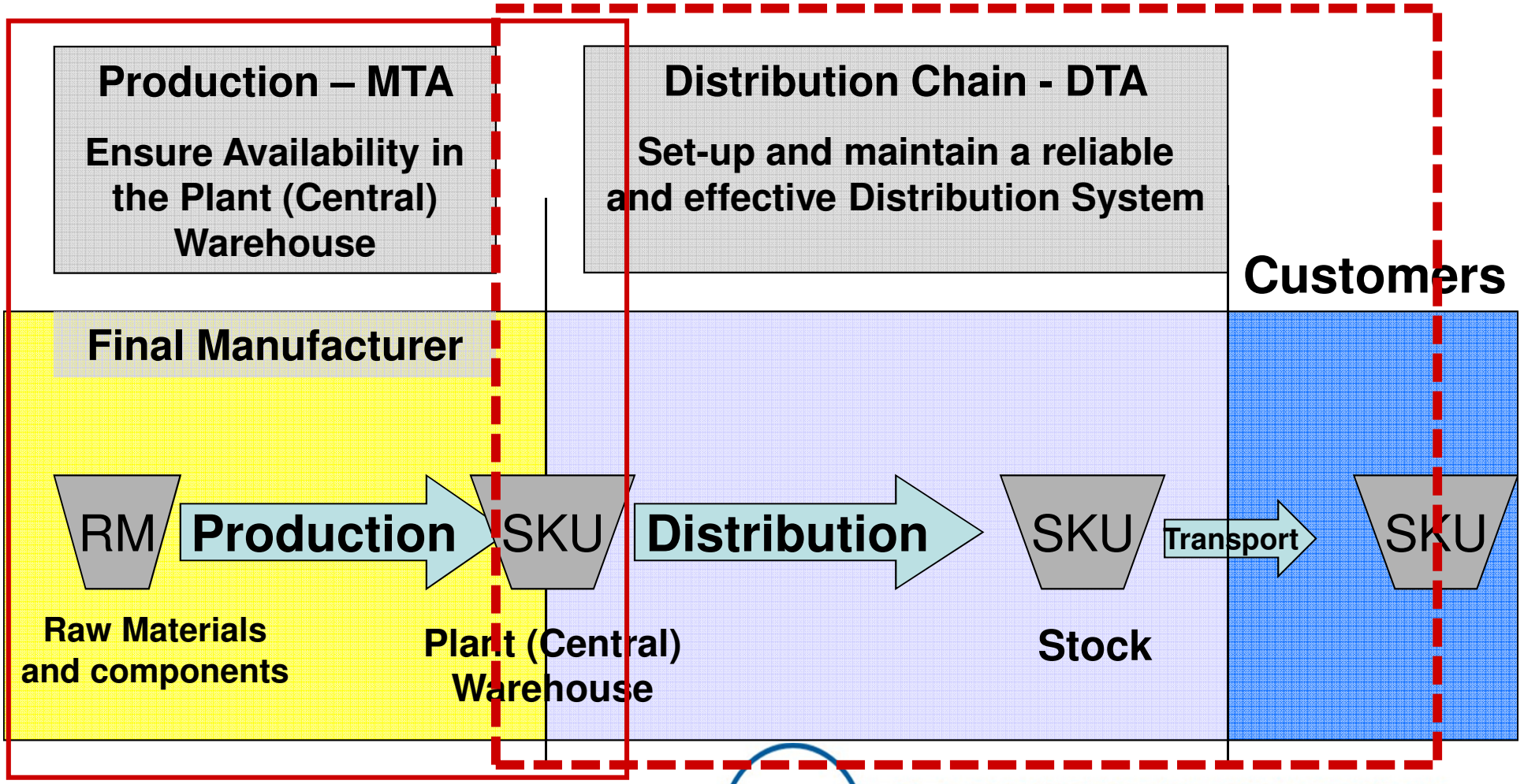
The logic of moving from MTO/MTS to MTA is that there is potential to grow the manufacturing company by offering availability to the downstream chain. The same logic is relevant for the rest of the supply chain.

The presentation here is based on manufacturers, some that have their own distribution system as independent distributors.

Operating MTO in environment that demands availability has created difficulties (limitations) to the system. Nevertheless, the system learned how to live with it and created rules and procedures. These rules and procedures cause the major challenges to the MTA implementation.

The pilot – applying the solution to limited number of SKUs and a part of the down stream channels – is very important step in the implementation.

Supply Chain Management (SCM)
Moving to TOC replenishment Solution
MTA and DTA



1. The Key Injections of the TOC Solution for MTA

Tactics: Production and Material Management are on the TOC Replenishment system

Mindset	Immediate improvement in availability	Continuous improvement
Produce to ensure availability	Injections 2-5	POOGI
Injection 1		Process of Ongoing Improvement
		Injections 6-8

Injection 2	Injection 3	Injection 4	Injection 5
Stock Buffers in the Plant (Central) Warehouse are maintained to ensure 100% availability, with Production Work Orders (WO) released according to the consumption from the P(C)W Buffers	Open Work Orders (WO) are prioritized according to the status of their corresponding buffers in the Plant (Central) Warehouse	Buffer Management for recovery actions is in place	Availability of Raw Materials and components is monitored and managed

1. MTA Key Injections - Challenges

Injection 1 – Mindset and the measurements

- Commitment to availability
- Higher inventory turns (lower DIOH)

Injection 2 –

- The concept of Stock Buffer, initial size and DBM
- Giving the control to the Plant Warehouse by replenishing consumption
- Very short horizon production plan (more Ad-Hoc).

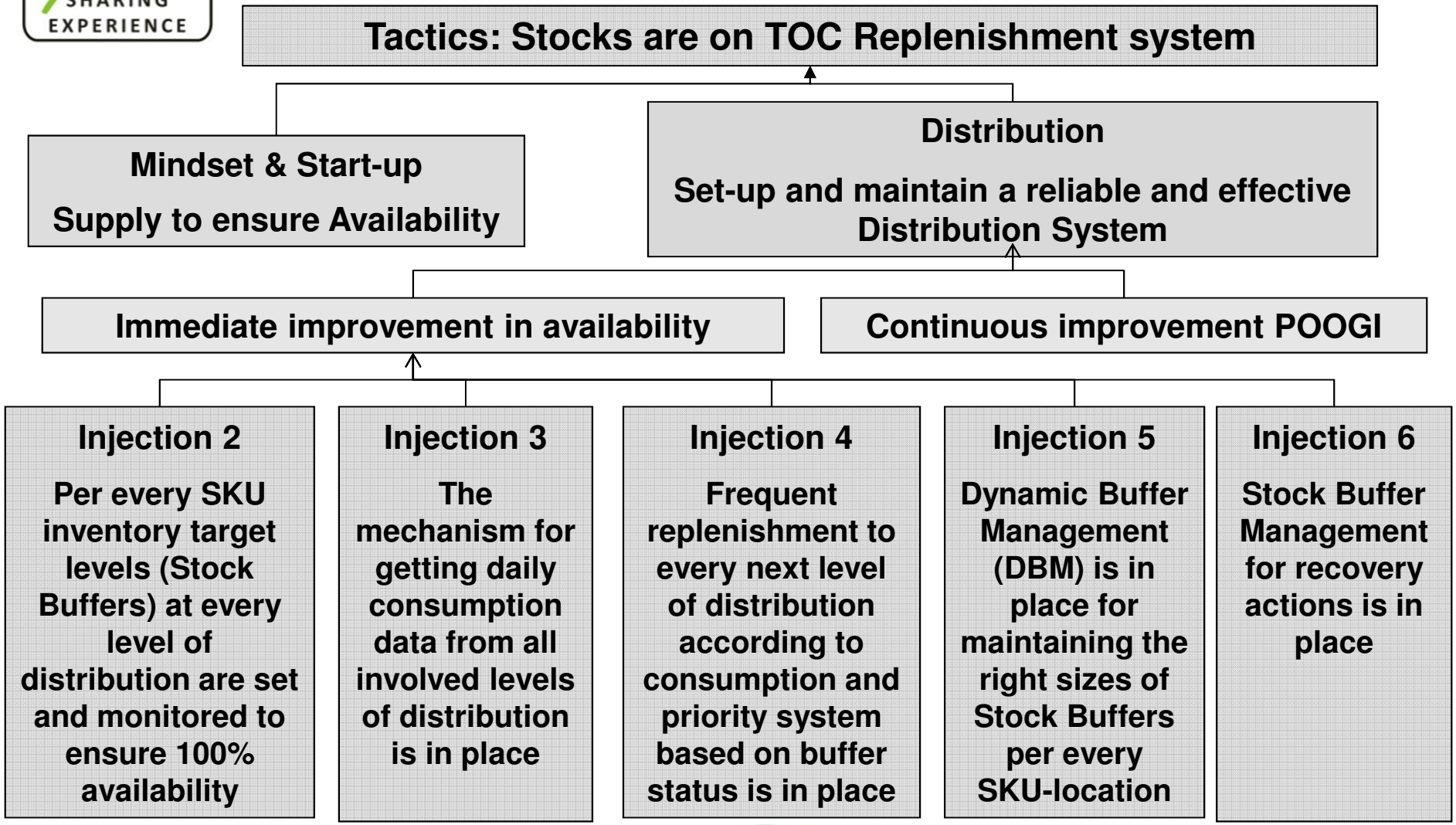
Injection 3 – setting priorities to WOs

Injection 4 – BM for recovery actions

- What to do with too many WOs in the Black and in the Red

Injection 5 – Availability of Row Materials and components

1. The Key Injections of the TOC Solution for DTA



1. DTA Key Injections - Challenges

Injection 1 – Mindset and the measurements

- Commitment to availability and to higher inventory turns (lower DIOH)

Injection 2 – Warehouses and shops

- The concept of Stock Buffer, initial size (concerns of shops) and DBM
- Giving the control to the Downstream Warehouse by replenishing consumption
- Uncertainty of the sales (stop pushing)
- Fears of shortages

Injection 3 – Getting daily consumption figures – "they will not agree due to fear of exposure"

Injection 4 – Frequent replenishment – "fear of increased transport costs"

Injection 5 – Resizing – the desire to resize before the learning is completed

Injection 6 – BM for recovery actions – "it is out of our control"

2. The Technical Implementation

The IT software is simple but demands a lot of detailed work.

Many times companies develop their own software based on Excel,

The first challenge is setting up the Stock Buffer Sizes.

For injection 1 there is a need for a global view: Availability and Inventory Turns (or DIOH)

For Injection 2 – there is a need to deal with every SKU individually.

For that there is a need to have the daily control file that gives the inventory profile of every SKU which is under the MTA.

The file is simple (can be an excel file) but it demands a lot of calculations and data manipulations to present the relevant information for managing availability.

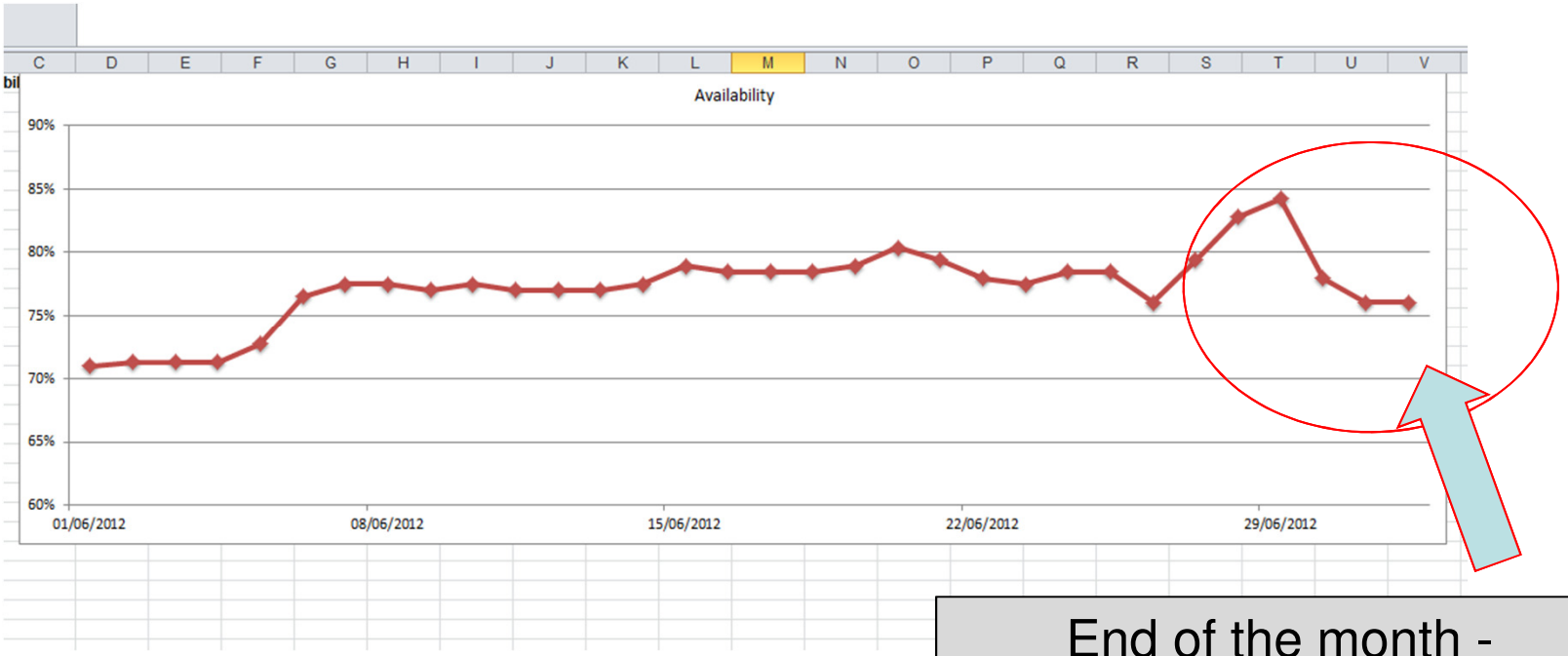
Injection 2 - Mechanics

Example – Daily Control File of Pilot SKUs in SFG Warehouse

	A	B	D	E	F	G	H	I	J	K
	Date	SKU - Name/Description	Buffer Size (Target Level)Buffer Size?)	Minimum Order Quantity	Balance on hand	Buffer Status	In Production	Buffer Statistics - What is the WO waiting for?	Corrective Actions	Date of Expected Delivery
72	01/07/2012		144	1	0	100%	144			
73	01/07/2012		64	1	0	100%	128			
74	01/07/2012		58	1	0	100%	64			
75	01/07/2012		336	1	0	100%	321			
76										
77	01/07/2012		195	1	1	99%	200			
78	01/07/2012		437	1	7	98%	450			
79	01/07/2012		360	81	106	71%	260			
80	01/07/2012		25	1	8	68%	20			
81	01/07/2012		50	1	16	68%	40			
82	01/07/2012		34	10	11	68%	20			
83	01/07/2012		37	1	12	68%	0			
84	01/07/2012		130	1	44	66%	94			
85										
86	01/07/2012		89	1	31	65%	30			
87	01/07/2012		57	72	20	65%	72			
88	01/07/2012		23	1	15	35%	6			
89	01/07/2012		150	50	99	34%	50			
90	01/07/2012		309	1	206	33%	0			
91										
92	01/07/2012		75	1	51	32%	0			
93	01/07/2012		170	72	116	32%	0			
94	01/07/2012		60	1	41	32%	0			
95	01/07/2012		172	1	121	30%	0			
96	01/07/2012		58	1	42	28%	0			
97										
98	01/07/2012		247	81	252	-2%	0			
99	01/07/2012		152	81	162	-7%	0			
00	01/07/2012		73	1	81	-11%	0			
01	01/07/2012		59	1	112	-90%	0			

Injection 1 – Availability Reports

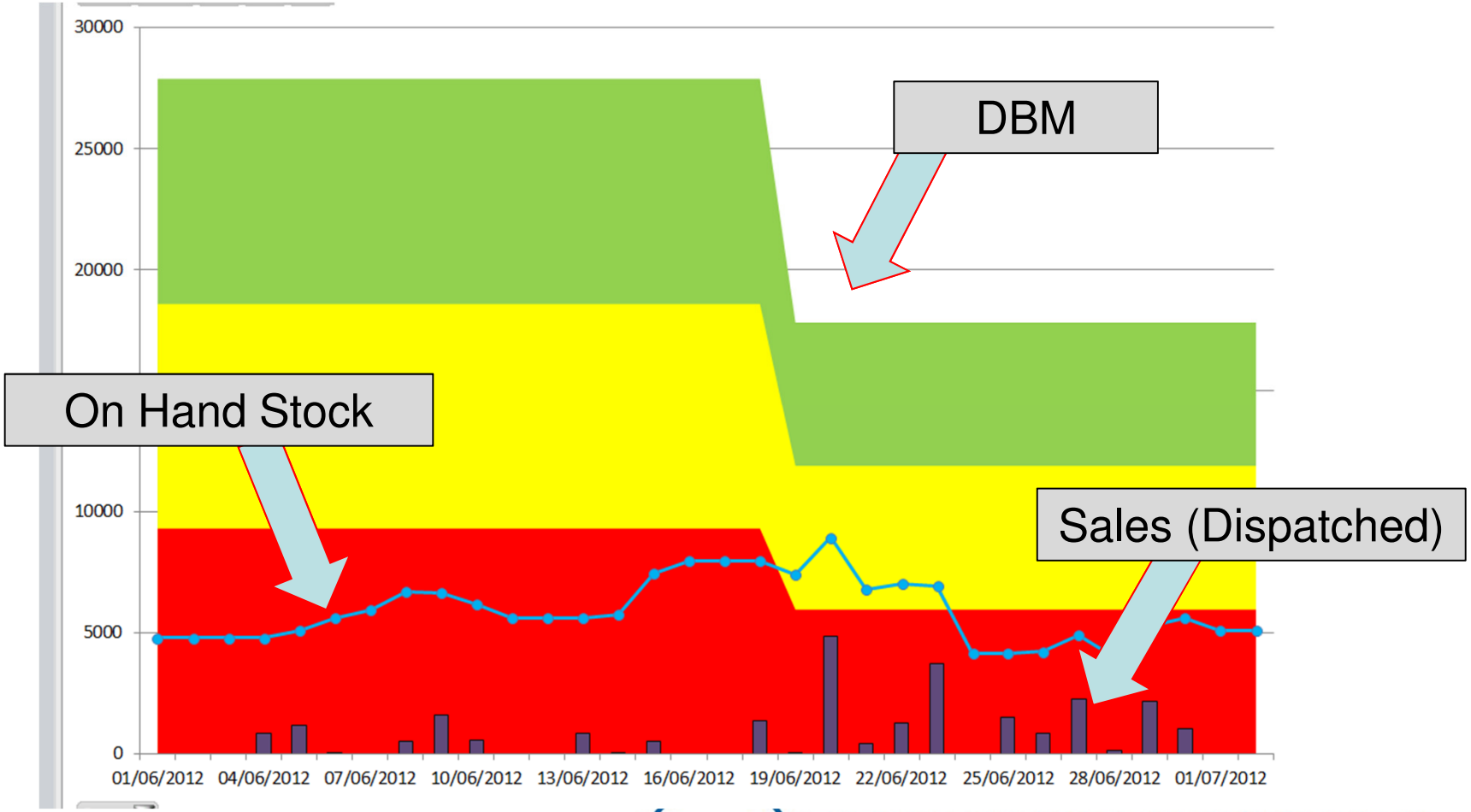
Example – Availability of a family of SKUs in the SFG Warehouse



End of the month - Deliveries

Managing every SKU for Availability with no excess inventory – Injection 2 for injection 1

Example of the profile of an individual SKU



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Managing the SKYs – Where to focus?

There is too much data!
How not to lose the big picture?

Average Penetration

Daily Buffer Penetrations per SKU

	16/08	17/08	18/08	19/08	20/08	21/08	22/08	23/08	24/08	25/08	26/08	27/08	28/08	29/08	30/08	31/08	01/09	02/09	03/09	04/09	05/09	06/09	Average Buffer Penetratio
5																							
6	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
7	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	100%	100%	100%	100%	100%	100%	100%	66%	71%	85%	85%	85%	86%	79%	79%	85%	94%	94%	94%	97%	98%	98%	91%
9	71%	76%	84%	84%	84%	95%	92%	84%	86%	94%	132%	132%	83%	104%	90%	82%	55%	55%	55%	100%	69%	71%	85%
10	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	45%	53%	48%	48%	48%	51%	71%	78%	84%
11	88%	100%	100%	100%	100%	100%	100%	69%	69%	69%	69%	69%	69%	56%	56%	76%	76%	76%	76%	83%	83%	83%	80%
12	100%	87%	83%	80%	80%	83%	99%	83%	98%	99%	100%	100%	47%	61%	74%	70%	61%	61%	61%	73%	84%	72%	80%
13	100%	100%	100%	100%	100%	100%	100%	14%	43%	66%	66%	66%	52%	74%	76%	63%	51%	51%	51%	64%	96%	100%	74%
14	53%	62%	62%	62%	62%	71%	71%	71%	75%	98%	66%	66%	64%	58%	58%	58%	69%	69%	69%	69%	73%	73%	67%
15	24%	29%	33%	33%	33%	34%	36%	50%	65%	65%	65%	65%	82%	84%	86%	86%	86%	86%	86%	89%	89%	89%	63%
16	81%	92%	75%	37%	37%	65%	65%	68%	80%	89%	89%	89%	73%	45%	47%	53%	40%	40%	40%	48%	68%	52%	62%
17	55%	90%	93%	93%	93%	68%	73%	71%	43%	44%	47%	47%	64%	69%	66%	60%	26%	26%	26%	65%	78%	73%	62%
18	58%	58%	58%	58%	58%	65%	98%	70%	64%	94%	94%	94%	91%	44%	56%	37%	23%	23%	23%	65%	74%	47%	62%
19	84%	58%	58%	50%	50%	53%	69%	70%	84%	72%	48%	48%	60%	44%	57%	71%	46%	46%	46%	71%	57%	44%	58%
20	51%	72%	82%	82%	82%	82%	37%	39%	39%	39%	81%	81%	81%	81%	58%	58%	16%	16%	16%	58%	58%	59%	58%
21	84%	97%	97%	67%	67%	100%	100%	70%	70%	85%	85%	85%	90%	62%	28%	28%	-13%	-13%	-13%	4%	18%	21%	55%
22	53%	38%	43%	43%	43%	59%	46%	19%	31%	38%	69%	69%	59%	63%	57%	68%	33%	33%	33%	93%	78%	69%	52%
23	46%	46%	46%	46%	46%	46%	20%	20%	20%	27%	70%	70%	76%	98%	78%	78%	35%	35%	35%	78%	59%	63%	52%
24	62%	61%	55%	55%	55%	58%	58%	55%	46%	53%	53%	53%	57%	53%	53%	51%	42%	42%	42%	42%	41%	39%	51%
25	44%	60%	64%	64%	64%	91%	100%	100%	100%	100%	100%	100%	31%	38%	-3%	0%	6%	6%	6%	17%	18%	18%	51%
26	45%	58%	52%	45%	45%	43%	30%	30%	44%	46%	46%	46%	65%	71%	67%	55%	55%	55%	55%	60%	58%	43%	51%
27	49%	54%	59%	25%	25%	27%	27%	43%	60%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	57%	57%	57%	48%
28	40%	49%	49%	4%	4%	34%	99%	54%	1%	91%	91%	91%	99%	99%	5%	-1%	4%	4%	4%	39%	91%	73%	47%
29	23%	32%	32%	32%	32%	63%	67%	67%	30%	30%	30%	30%	35%	35%	35%	35%	90%	90%	90%	95%	28%	12%	46%
30	56%	59%	59%	46%	46%	49%	37%	37%	42%	48%	48%	48%	56%	56%	58%	42%	37%	37%	37%	40%	39%	39%	46%
31	55%	64%	51%	43%	43%	43%	35%	43%	39%	50%	50%	50%	50%	58%	41%	42%	49%	49%	49%	51%	27%	27%	46%
32	46%	62%	65%	42%	42%	43%	46%	48%	39%	50%	50%	50%	58%	39%	20%	37%	36%	36%	36%	51%	56%	56%	46%
33	50%	54%	60%	60%	60%	37%	37%	30%	36%	44%	44%	44%	48%	48%	49%	46%	39%	39%	39%	39%	45%	47%	45%
34	56%	68%	69%	43%	43%	43%	31%	31%	33%	40%	40%	40%	46%	46%	46%	39%	41%	41%	41%	43%	55%	58%	45%
35	43%	49%	87%	39%	39%	72%	34%	42%	20%	25%	25%	25%	49%	53%	56%	59%	36%	36%	36%	65%	68%	29%	45%
36	53%	53%	56%	28%	28%	38%	38%	40%	49%	49%	31%	31%	31%	42%	34%	43%	43%	43%	43%	80%	61%	70%	45%
37	87%	45%	32%	32%	32%	51%	57%	27%	36%	40%	40%	40%	36%	53%	59%	39%	54%	54%	54%	66%	33%	15%	45%
38	44%	57%	57%	28%	28%	30%	49%	55%	26%	12%	12%	12%	33%	45%	53%	24%	71%	71%	71%	100%	26%	26%	42%
39	50%	54%	58%	39%	39%	45%	34%	34%	35%	36%	36%	36%	33%	40%	30%	31%	45%	45%	45%	59%	53%	53%	42%
40	73%	51%	55%	51%	51%	47%	39%	40%	37%	42%	34%	34%	34%	33%	32%	36%	36%	36%	36%	38%	43%	47%	42%
41	51%	52%	55%	55%	55%	38%	41%	35%	28%	31%	37%	37%	50%	40%	33%	36%	32%	32%	32%	40%	41%	41%	41%
42	63%	46%	46%	46%	46%	93%	64%	43%	15%	27%	27%	27%	52%	63%	47%	54%	22%	22%	22%	22%	22%	22%	40%
43	36%	45%	49%	49%	49%	70%	9%	12%	24%	39%	39%	39%	50%	69%	7%	11%	51%	51%	51%	62%	62%	-2%	40%
44	53%	43%	45%	45%	45%	50%	51%	39%	37%	46%	46%	46%	50%	32%	36%	38%	26%	26%	26%	30%	31%	31%	40%
45	29%	100%	100%	71%	71%	71%	86%	14%	14%	14%	14%	14%	14%	93%	93%	-5%	-5%	-5%	-5%	9%	38%	38%	39%
46	87%	83%	65%	49%	49%	43%	28%	60%	47%	12%	12%	12%	24%	23%	40%	45%	27%	27%	27%	30%	31%	33%	39%
47	43%	49%	53%	53%	53%	18%	21%	21%	23%	26%	26%	26%	47%	71%	50%	54%	30%	30%	30%	41%	43%	43%	39%
48	52%	55%	53%	53%	53%	76%	50%	52%	-2%	13%	13%	13%	13%	23%	23%	25%	33%	33%	33%	44%	51%	74%	38%
49	92%	73%	47%	47%	47%	50%	51%	55%	59%	6%	6%	6%	33%	33%	36%	48%	17%	17%	17%	22%	26%	30%	37%
50	52%	54%	57%	57%	57%	27%	30%	36%	15%	17%	17%	17%	41%	25%	32%	8%	37%	37%	37%	62%	68%	30%	37%
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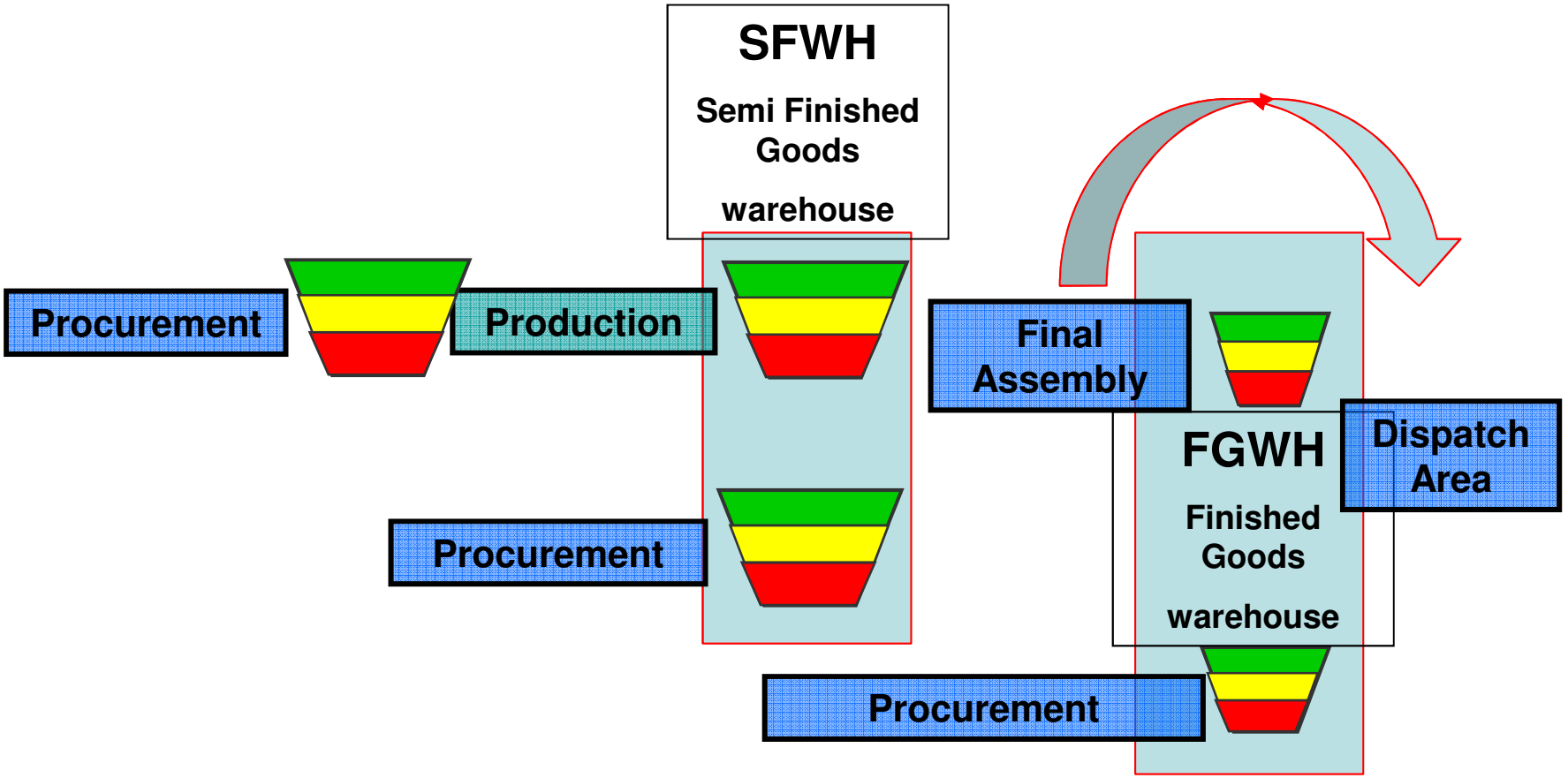
52	6%	6%	6%	6%	6%	6%	6%	6%	11%	69%	69%	69%	94%	67%	28%	33%	33%	33%	33%	58%	100%	67%	37%

3. Issues to be considered for the implementation *(as raised by the impelementation team)*

Major Concerns of Top Management at the outset

1. How to handle Final Assembly?
2. How to handle the dealers?
3. Payment terms for the dealers. [NBR]
4. Motivation – How do we handle the pay for our people?
5. RM Budget – how should we plan and control it? What will be the impact on cash flow?

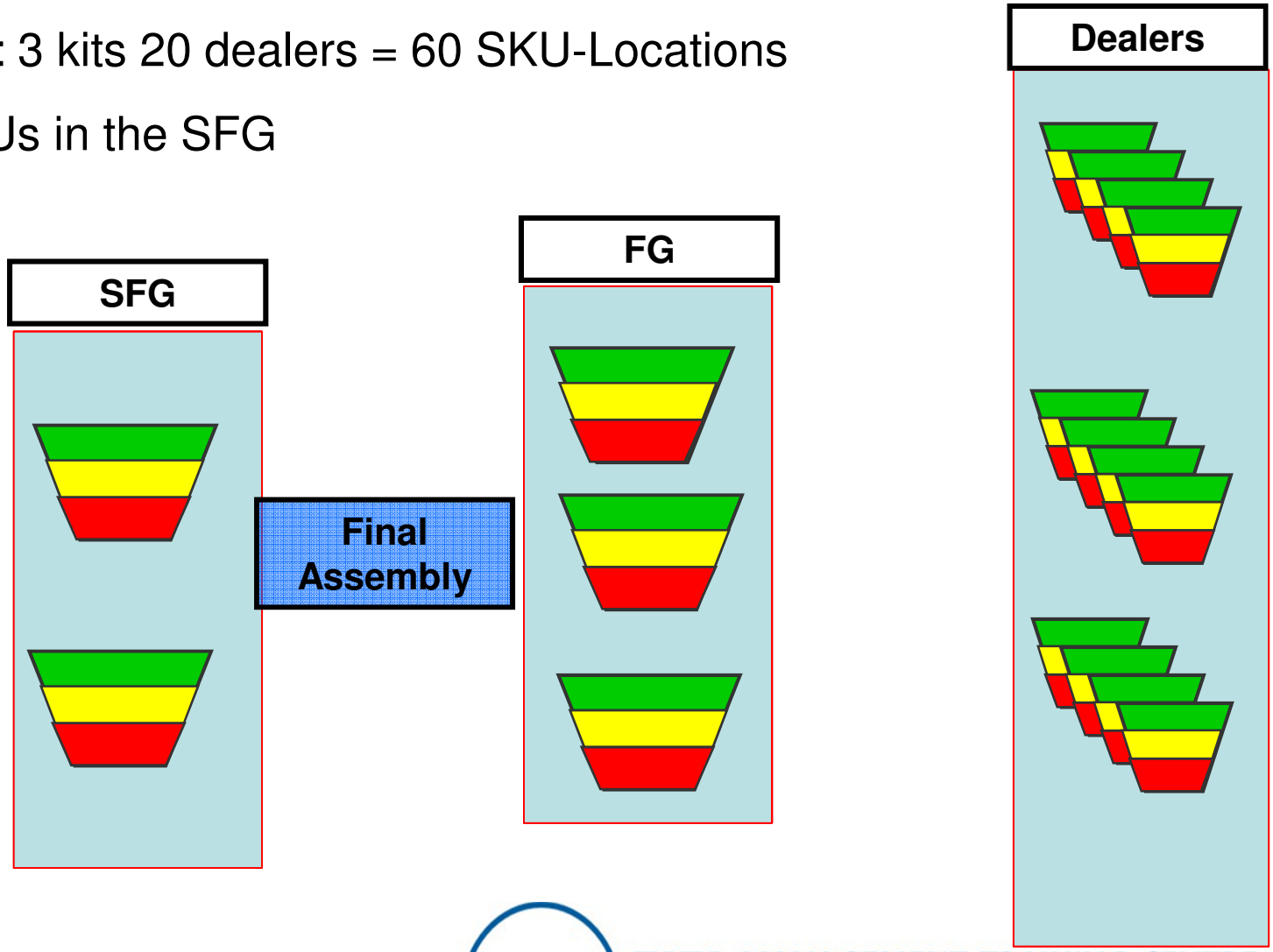
General Structure of the implementation



4. The Role of the Pilot

We suggested: 3 kits 20 dealers = 60 SKU-Locations

3 kits = 12 SKUs in the SFG



The Stakeholders in the pilot

1. Top Management
2. Production (owners)
3. Logistics
4. Maintenance
5. Tooling
6. Internal Supply - Suppliers within the group
7. Purchasing from China – RM, assemblies, products
8. Purchasing – Local and European Suppliers
9. Sales
10. Dealers
11. Accounting Department

5. Pilot - outcomes

Pilot was run for one month

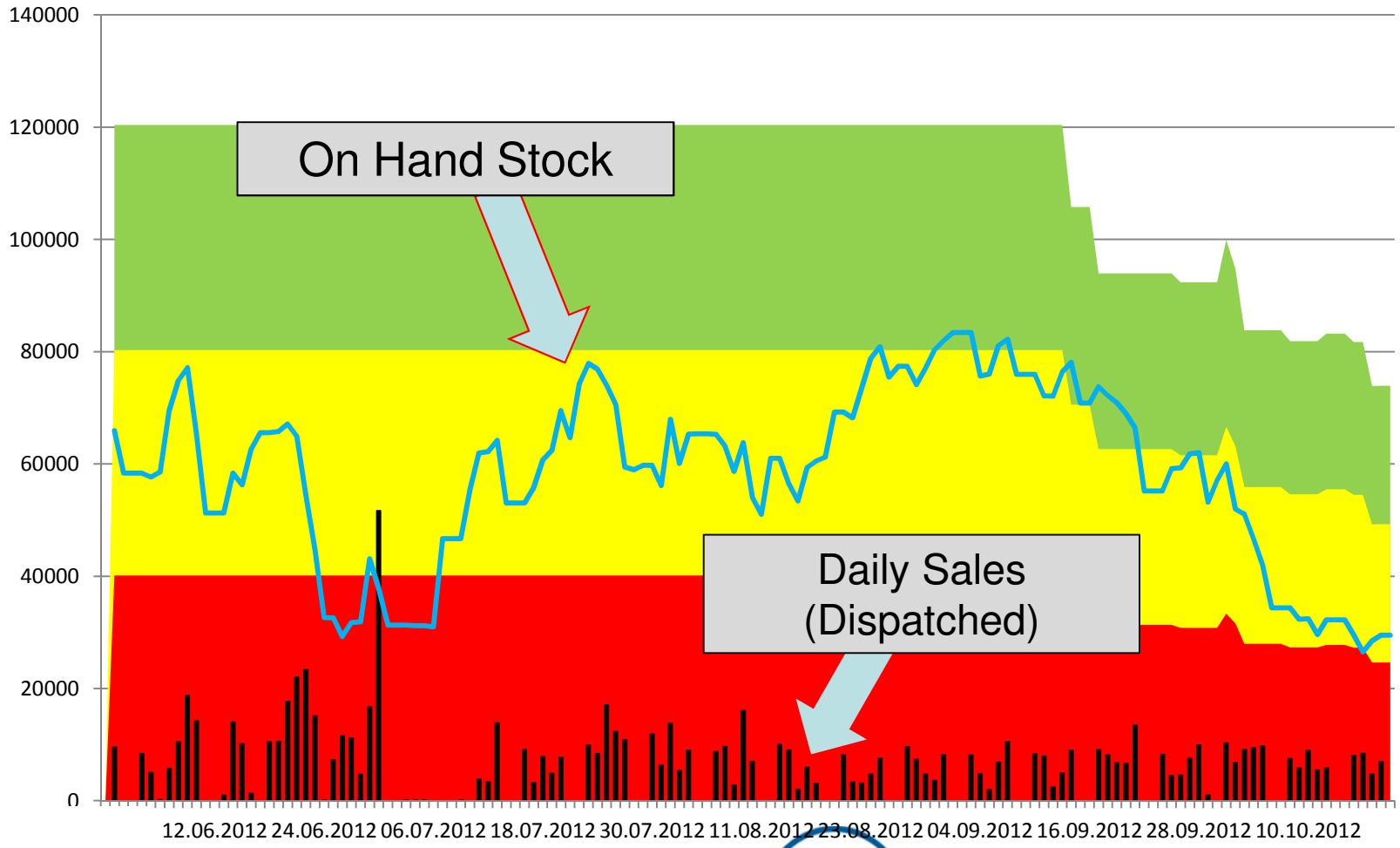
1. Sales – no increase
2. Transport - +15-20% (previous decision that coincided with the MTA)
3. OE – no impact
4. FG Inventory – minus 30%, SFG – no change
5. WIP – down in general, (for one production area - reduction of 15%)
6. Impact on production – Kitting up, labor hours up
7. Kitting – used to work to monthly plan which was “great”. Smaller batches – cause difficulties.
8. A Major concern – one supplier that provides C-type parts. They work to monthly plan. They supply to the plant as well as to their own customer (on MTO).

5. Pilot - outcomes

Results after 2 months – with increased number of SKUs under MTA - Improvements and achievements:

- Uniform distribution of shipments on time, normalizing the distribution of products to dealers
- Simplify the process of planning and focus on the most problematic positions
- Rapid response to changes in demand production
- Increasing the number of proposed improvements through better understanding of problem areas, increase employees' initiatives
- Changed the motivation based on TOC (production management, foremen, workers)

A Typical profile of a SKU under MTA



Pilot – outcomes - Negative

Results after 2 months – with increased number of SKUs under MTA – Problems and Difficulties:

- Consideration of the lines with a high degree of load
- There has been a fall in the volume of products shipped after implementing MTA dealer network due to the large presence of the latest products
- Due to a decrease in shipping network, and the collection of third-party supplies semi-finished stocks saw an increase in the holding
- The inertia of consciousness and commitment of staff to the old methods of management influence the rate of implementation of the new approach to the management of the entire holding
- Introduction of new management principles requires global changes in all areas of

6. Potential NBRs

1. Short term loss of sales
2. The impact of the MTA parts and products on the MTO SKUs
3. Overloading the production area with orders for filling up the buffers
4. Can the company support the increased inventory in order to achieve the target level of all MTA SKUs?
5. Dealers reaction to increased availability and in reliability
6. What to do with Bottlenecks – Dealing with demand influenced by historical shortages
7. Impact on managing assembly
8. Impact on the productivity of assembly of semi-finished goods

7. Practical Lessons

Concerns:

1. How to budget the purchasing
2. How to incorporate it in the cash flow

Assessing the levels of inventory and what can be learned from the findings

FG profile TVC 28-30%

1/9 81m

10/9 68m

Dead Stock – 10 m (5-7 days)

46m – 18.4 days **(Daily sales - 2.5 m)**

38m – 15.2 days

TVC of sales: 30-40%

SFG profile

1/9 118m

8m kitted (3 days)

22 Sister company

59 China (4 m once a month)

22 own production

8 other local suppliers

88m - 35.8 DIOH

How to Budget

RM Budget – how should we plan and control it?
What will be the impact on cash flow?

RM	WIP	SFG - FG
Suppliers + frequency Consumption Buffers (targets)	Sum of all targets	Sum of Buffers (targets)

Budget for the month = TVC of the replenishment
+/- Delta T.L
+/- Delta of what is missing for the T.L.

8. What happens if the pilot is skipped

Due to the financial pressure the company decided to skip the pilot and to apply the MTA solution to all stock SKUs

The company was not ready for the implications of the MTA.

As NBR were not addressed prior to the start the company faced many NBRs during the implementation

The pilot has also to establish the conditions in which increased availability cause increase in sales. Without that - the improvements are only internal and not always can justify the investment in implementing MTA

Our Recommendation - Do Not Skip the Pilot!!!

Make it short, focused and learn fast how to manage the new way.