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The critical role of managerial decisions for production planning

Jelena Fedurko

TOC Strategic Solutions, Estonia

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Jelena Fedurko

Jelena has 14 years of TOC experience as a trainer and consultant providing support in TOC implementations in the areas of people management, production, supply chain, project management.

Jelena has worked in Japan, Poland, Turkey, Italy, Russia, Ukraine, India, China, Chile, Colombia, Mexico and other countries throughout the world.

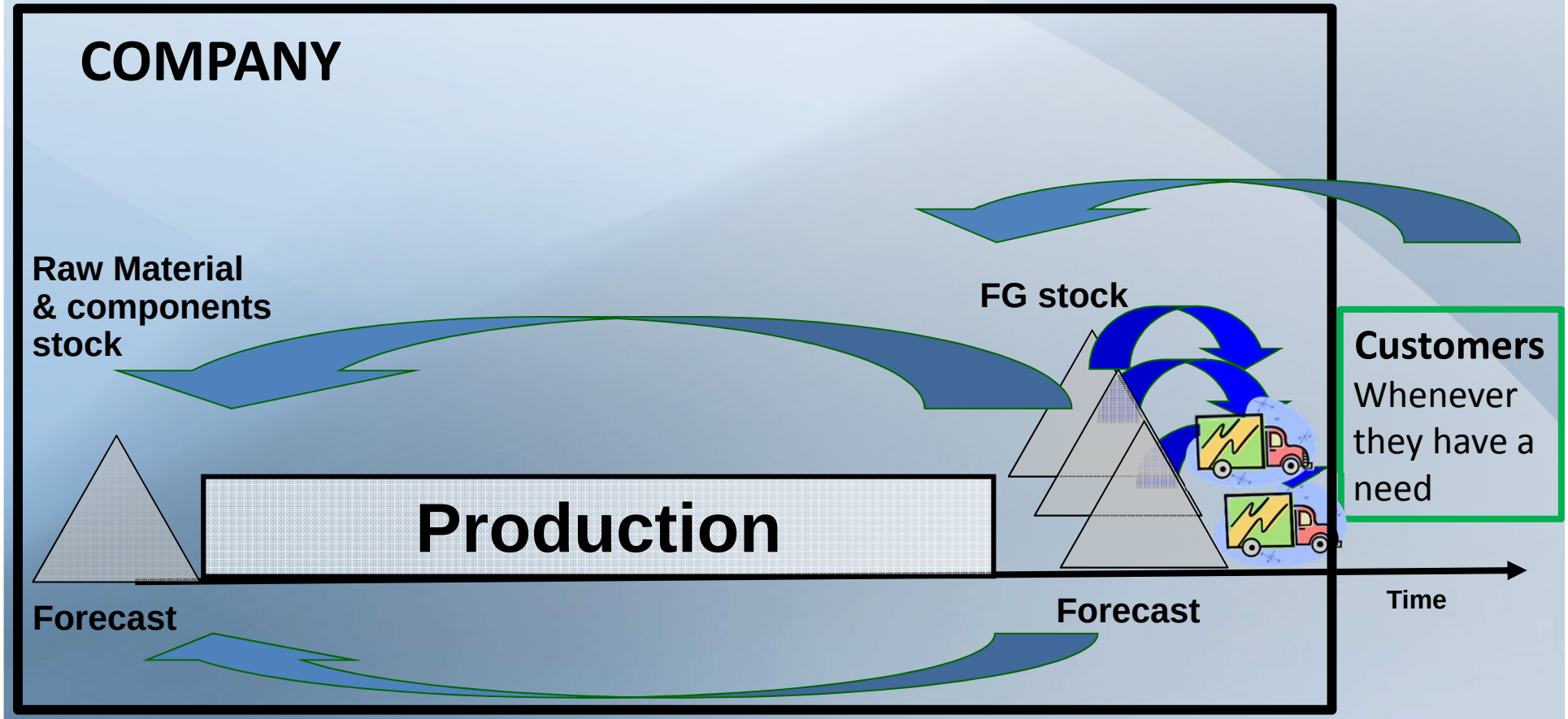
Jelena is the author of the books *Behind the Cloud – Enhancing logical thinking* and *Through Clouds to Solutions.* The books present new developments in the area of working with assumptions, UDEs and UDE Clouds.
Together with Oded Cohen, Jelena has co-authored the book *TOC Fundamentals*.

She has authored numerous articles on TOC concepts and implementation, and has contributed to and edited several TOC books.

jelenafedurko.gs@gmail.com
www.toc-strategicsolutions.com

The way the majority of manufacturing companies work today

Traditional flow of material – as it is now



The way the majority of manufacturing companies work today

- In September-November the company makes the forecast for the total production plan for the next year

The company justifies the need for the yearly production plan by the need to

- make a yearly budget,
- plan capital investment,
- sign yearly contracts with suppliers (commitments on volumes),
- meet the yearly sales or profit targets set by owners.

- On a monthly basis production builds a more detailed production plan that is adjusted during the month according to actual customers' orders.
- On a weekly basis production planning build a weekly production plan (specific SKUs and quantities) proceeding from available capacity and materials/components – this plan is frozen for the coming week.
- The production plan is built in tons/cubic meters/units.
- Meeting the production plan is measured as % of actual tons/cubic meters/number fof units vs. planned.
- Initial yearly production plan is not altered at all, or can be reviewed once or twice during the year based on actual sales.
- During the year, top management monitors how much production is lagging behind vs. the initial yearly production plan.

The resulting current reality

- As a rule, production department meets the production plan - IN STANDARD HOURS, NUMBER OF UNITS, TONS, CUBIC METERS, BUT NOT IN THE PLANNED ASSORTMENT
- People from the production planning say that what the production department dispatches daily makes only 80% (or less) in the assortment or number of units of what was put in the plan for this day.
- FG warehouse has overstock of some SKUs (up to 5-6 months of sales, or more) and shortages of others.
- FG warehouse has stock (WHICH STAYS THERE FOR A LONG TIME) of SKUs that WERE NOT MEANT TO BE HELD AS "MAKE-TO-STOCK" SKUs. Even though the amount of stock of each such "not-to-be-stocked" SKU may be not big, the total amount of such stock may be considerable.
- RM/components stock can be frightening in numbers. This is when there are frequent cases that those materials that are needed to be released in production are not available.
- And so on…

TOC logistical solutions for production

There are 2 global mechanisms in the TOC production solutions:

- Production planning – allows to focus attention
- Execution control – through
  - establishing the system of priorities
  - recovery actions

Major TOC solutions for production
MTA – Make to Availability
MTO –Make to Order

Objectives of implementing MTA

MTA is aimed at achieving one or both objectives:

- **Supporting sales by less inventory** → improving inventory turns.
- **Increasing sales through improving availability** → reducing lost sales.

Objectives of implementing MTO

MTO is aimed at achieving three objectives:

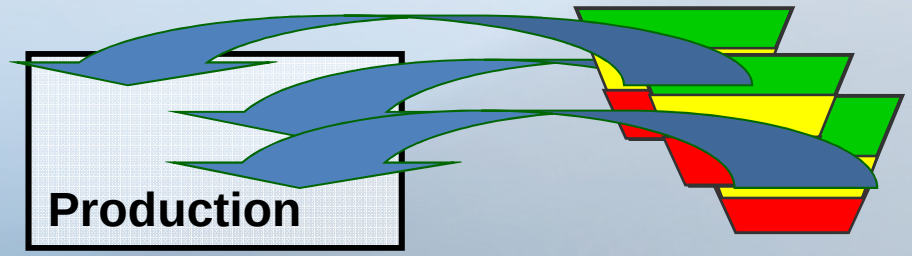
- **Ensuring DDP (Due Date Performance)** → improving reliability of the producer.
- **Reducing WIP** → improving material inventory turns.
- **Reducing QLT (Quoted Lead Time)** → creating competitive advantage.

Mixed production environment

Orders to replenish to the buffers in the Plant (Central) Warehouse are managed as MTA. Release of WOs to production is based on buffer status.

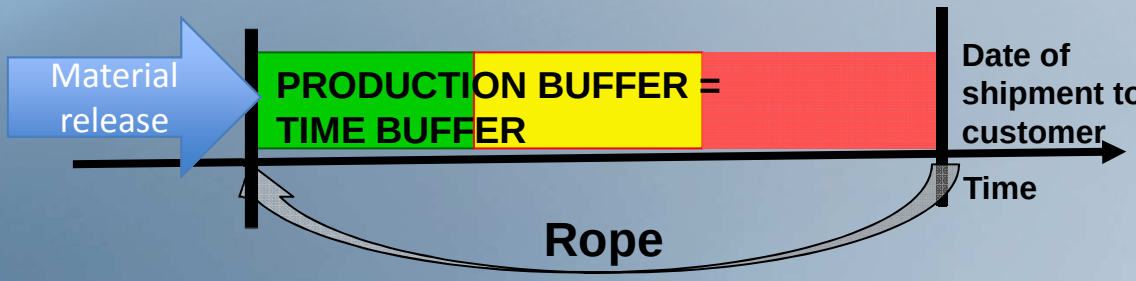
STOCK BUFFERS – per SKU in the P(C)W

In MTA – production does not have a predetermined timing of release for each WO



This is the mode of managing SKUs that are prescribed for MTA - to replenish stock buffers.

Parallel to working in the MTA mode, the same production may manage SKUs that are produced to order – MTO



This is the mode of managing SKUs that go not to the buffer but to a concrete customer order with a shipping date.

Customers orders are managed as MTO. Release of WOs to production is based on the timing of the starting point of production buffer.

Major difficulty for Production Planning, especially in MTA and in mixed environment

WHEN TO RELEASE MATERIAL to production?

- Especially if the production planning system has been designed to work on the basis of a weekly (monthly) production plan?
- And what if the “anchor” for production planning is not the first operation but final assembly or subassembly?
- And what if customers orders are sporadic, production may or may not produce the order within the customer tolerance time, while material delivery from suppliers is not flexible and unreliable and it is expensive to hold the material stock or the company policy does not allow to hold the material stock?

The role of production planning in improving Finished Goods inventory turns and availability

MTA: supporting sales with less inventory – Improving FG Inventory Turns

We want to see one of the 2 situations:

1. Amount of stock decreases, sales grow

	Stock, daily average, units	Sales
2012	594.711	579.000
2013	460.441	2,095.000
		Sales/avg stock
2012		0.97
2013		4.55
Improvement		4.67

2. Amount of stock is the same or increases, however, the relative increase in sales is higher than the relative increase in stock

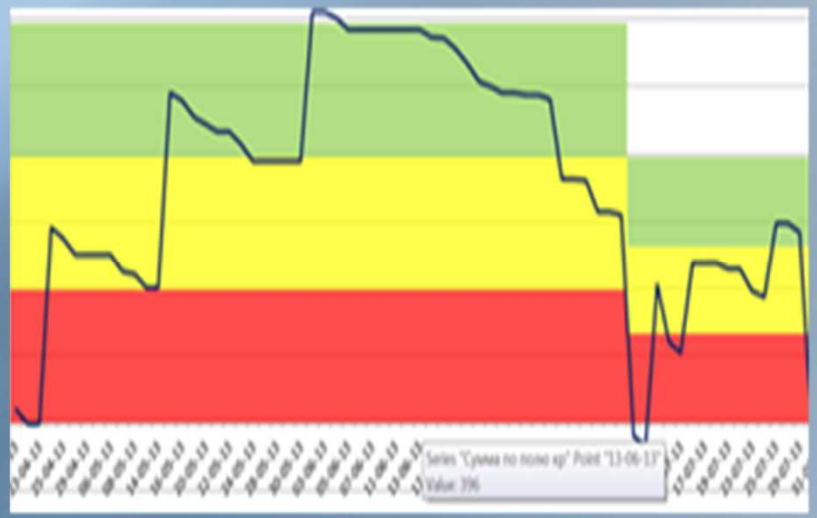
	Stock, daily average, units	Sales
2012	1,314.447	690.000
2013	1,505.059	1,691.000
		Sales/avg stock
2012		0.52
2013		1.12
Improvement		2.14

Improving Inventory Turns through managing the amount of FG stock in the warehouse

MTA provides a mechanism to MANAGE FG STOCK – WHAT TO HOLD AND HOW MUCH

This is what happens when we manage "warehouse SKUs" the MTA way:

1) Slow movers are NOT included in the list of SKUs to be stocked at the warehouse.
2) The maximum allowed quantity of inventory to hold "on hand" in the FG warehouse ("on hand free to be sold") is limited by the buffer target level, and the buffer size is dynamically reduced if "on hand" is too long in green.



The role of Production Planning in improving inventory turns

- **Do not plan to produce more than limited by the buffer target level or numbers in the customer order**

Production (foremen, operators) do not produce ON THEIR OWN INITIATIVE. They produce according to the production plan that is given to them and that contains SKUs and quantities.

How does it "happen" that even with a strict limiting factor (maximum is limited by the buffer target level or the size of the customer order) production produces more?

The role of Production Planning in improving inventory turns

How does it "happen" that even with a strict limiting factor (maximum is limited by the buffer target level or the size of the customer order) production produces more?

- **Divisibility**

  For instance, the economical cut of a metal sheet is for 12 units.
  The amount to be replenished to the buffer is 15 units.
  How many units will be cut?
  Add to that the policy that prohibits having WIP, or
  the fact that parts get damaged if not immediately assembled after being cut.

How will this impact the amount of FG sent from the production to the warehouse, and hence the FG inventory turns?

The role of Production Planning in improving inventory turns

How does it "happen" that even with a strict limiting factor (maximum is limited by the buffer target level or the size of the customer order) production produces more?

- **"We need to give people work"**
  - **Generally**

  A certain production cell can manufacture only a limited line of products.
  Currently, there are no customers orders for these products. And no consumption from stock buffers of these products.
  Should we send people home on an unpaid leave? On paid leave? What if such situation happens several days every month?

How will this impact the amount of FG sent from the production to the warehouse, and hence the FG inventory turns?

The role of production planning in improving availability

How does it "happen" that even with a strict limiting factor (maximum is limited by the buffer target level or the size of the customer order) production produces more?

- "We need to give people work"
  - This shift
  - This morning the operation upstream produced/identified faulty parts. OR
  - Just now a machine broke down in the upstream operation. According to the production plan for today, this operation was supposed to feed parts to the next operation to work on them in the afternoon. Due to the breakdown, these parts will not be produced this morning, and the next operation will find itself without work in the afternoon. However, in the upstream operation there is another equipment that can produce different parts for different FGs that the next operation can produce in afternoon. The material is available and production is certain that these FGs will eventually be sold. What do you think will be done?

How will this impact the amount of FG sent from the production to the warehouse, and hence the FG inventory turns?

Two very important things to understand about availability

1. When a company sells products that can be easily substituted or bought from competitors, availability of FG in the company's warehouse may not be important for the customers, but it is IMPORTANT FOR THE COMPANY.

Because – if the product is available there is a chance that it will be bought. Otherwise there will be no sale at all.

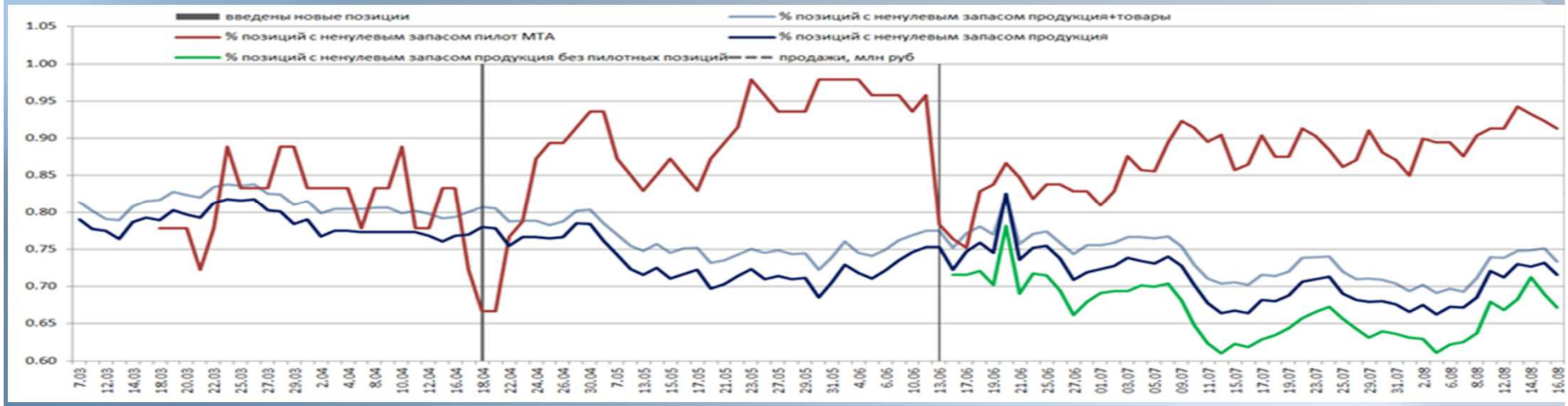
2. Just improving availability gives the increase in sales ONLY EQUAL TO PREVEOUSLY LOST SALES DUE TO NON-AVAILABIITY.

After the sales growth potential has been used up due to preventing lost sales because of non-availability, SALES STOP GROWING! This is natural. Companies do NOT have endless growth in sales of the goods that they are overstocked with, even though the overstocked SKUs are available.

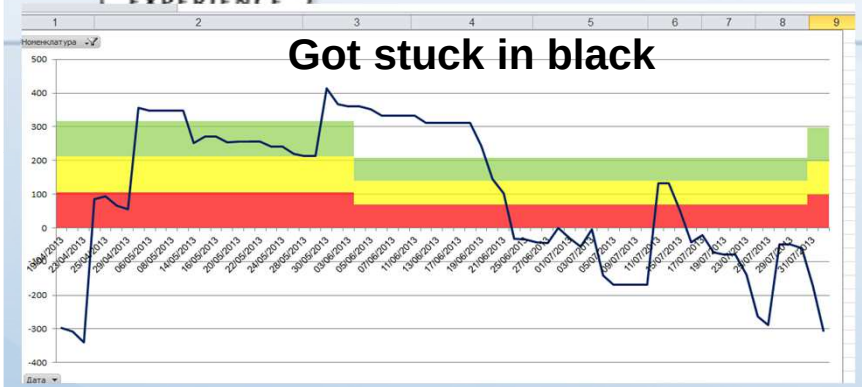
To ensure that sales will keep on growing the company needs conscious efforts of marketing and sales.

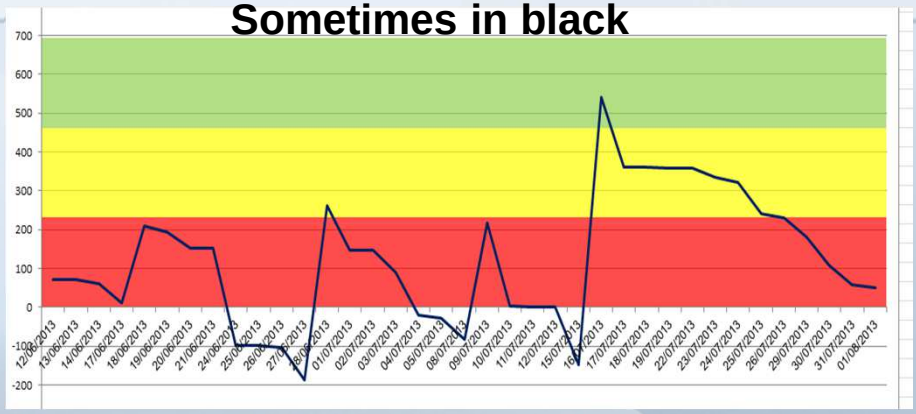
How to measure availability level

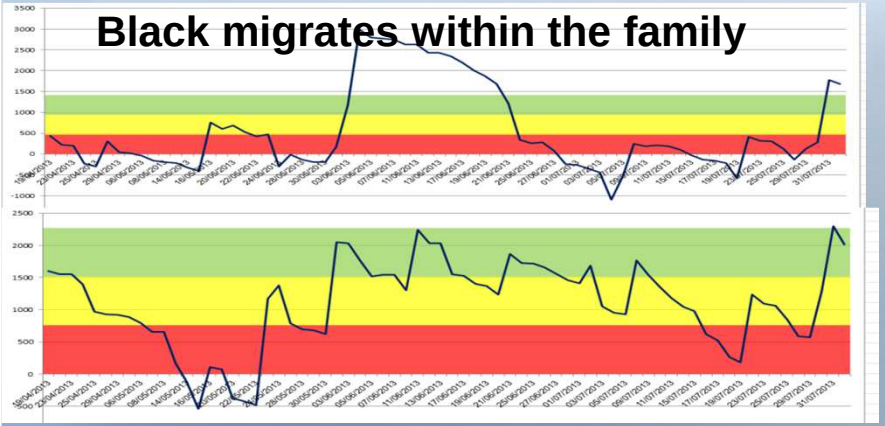
- Availability level is measured as the ratio of the number of SKUs that the company does not have available on-hand at the warehouse "free "to be sold at the moment of measuring to the total number of SKUs in the MTA list.
- The AVAILABILITY LEVEL IS NOT CONNECTED WITH THE AMOUNT OF EACH SKU IN THE WAREHOUSE (as long as "free on hand" of the measured SKU is above 0 or whichever number is determined as minimum to be declared "available"). Therefore, it is WRONG to say that "the availability of this SKU has increased because now we have 1800 units of this SKU in the warehouse as compared to 800 units before".
- If we have 100 SKUs in the MTA list. Today out of these 100 SKUs we do not have 15 SKUs "on hand free to be sold" (even thought we may have physical stock of these SKUS booked for certain clients and waiting to be picked up) , this means that the availability level is 85%.

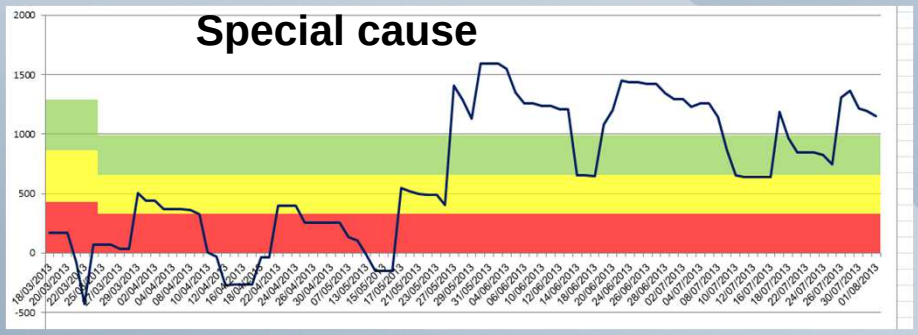


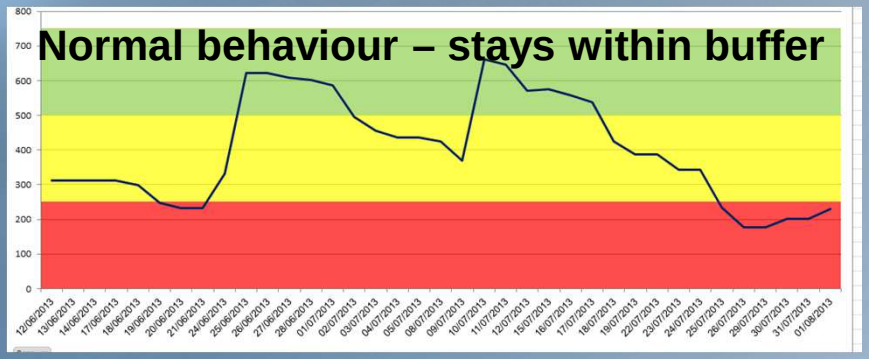
Availability profiles – SKU behaviour

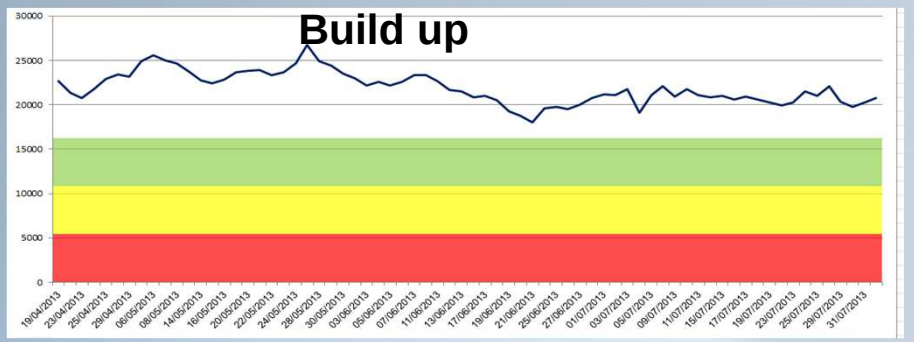












Link between availability level and production planning

Due to what is the availability level of pilot SKUs consistently higher than that of non-pilot SKUs?

Phase 1 18 SKU

Day 1
18.03.13

After 5 days
23.03.13

After 2 weeks
01.04.13

Phase 2 – added 28 SKU = 47 SKU

Day 1
19.04.13

After 10 days
29.04.13

One month later
30.05.13

How else can production planning impact availability?

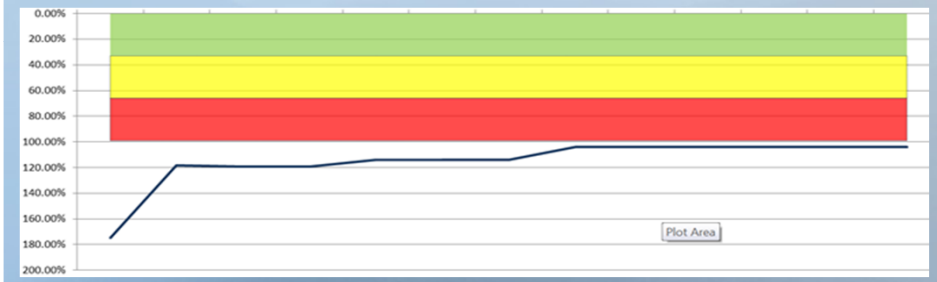
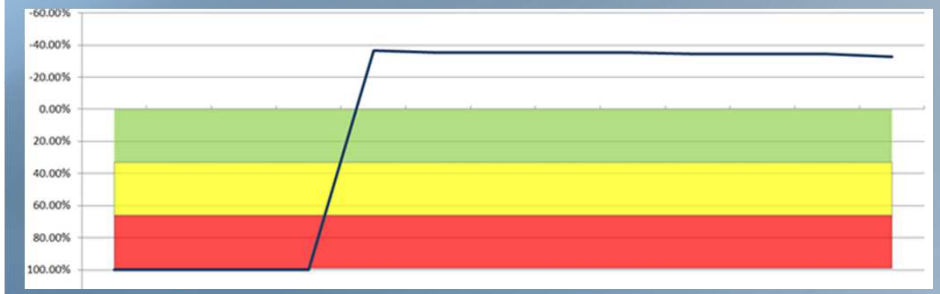
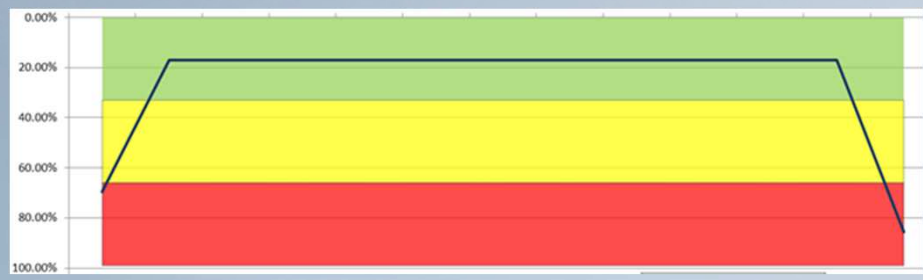
Determining the initial target level (stock buffer size).

Monitoring buffers:

- To understand whether the Red zone REALLY IS the Red zone (in other words, should this SKU be included in the production plan for replenishment).
- To decide whether the SKU should be treated as MTA.

Making the decision whether the SKU quantity to be included in the production plan should replenish the buffer to the target level OR lower.

Planning replenishment so that “on hand” would be about mid-yellow.

Reducing «Reliable Replenishment Time from production» – through reduction of planning horizon from one week to 2-3 days rolling planning.

Production planning must make a decision regarding such buffers