How to Production Plan and Control

Value Chain Competitiveness (VCC)

Version: 1

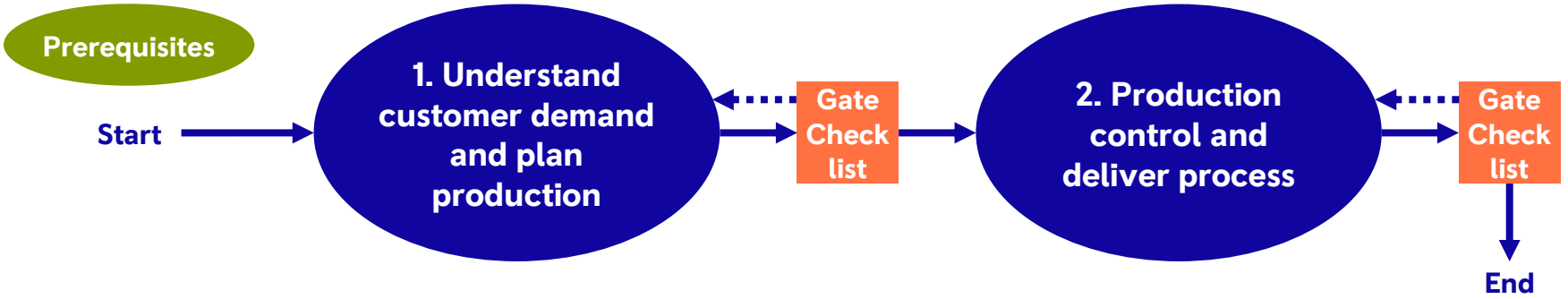
December 2019

How to Production Plan and Control

BACK Map NEXT

Scope

Objectives & Principles



Scope

This ‘How To’ will enable you to:

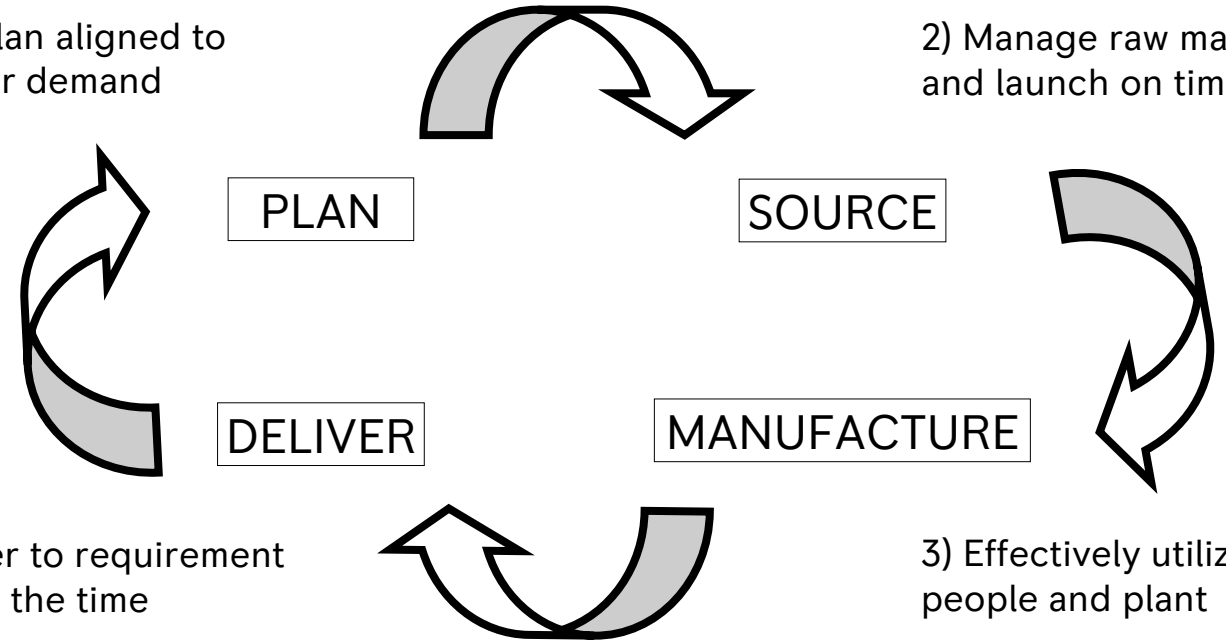
- Understand and engage in simple practical Production Planning & Control (PP&C) activities
- Analyse the process of taking the customer demand into a system of work through the facility
- Manage production plan with cross functional communication to achieve business needs
- Plan and prioritise material at asset level
- Visualise and organise WIP
- Track WIP movement through to delivery

Objective and Principles

- To provide simple techniques to improve & control the material flow around the production facility

1) One plan aligned to customer demand

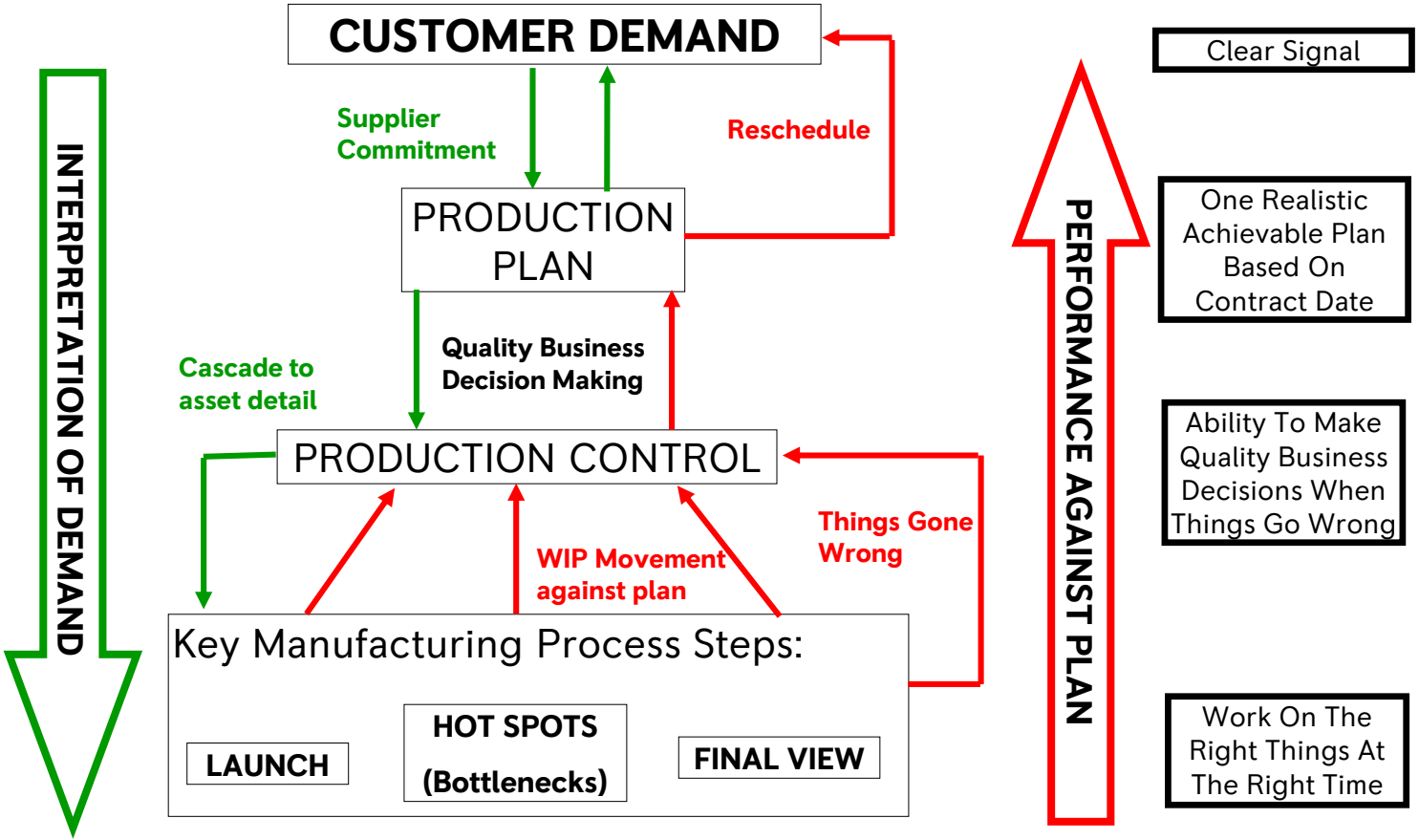
2) Manage raw materials and launch on time



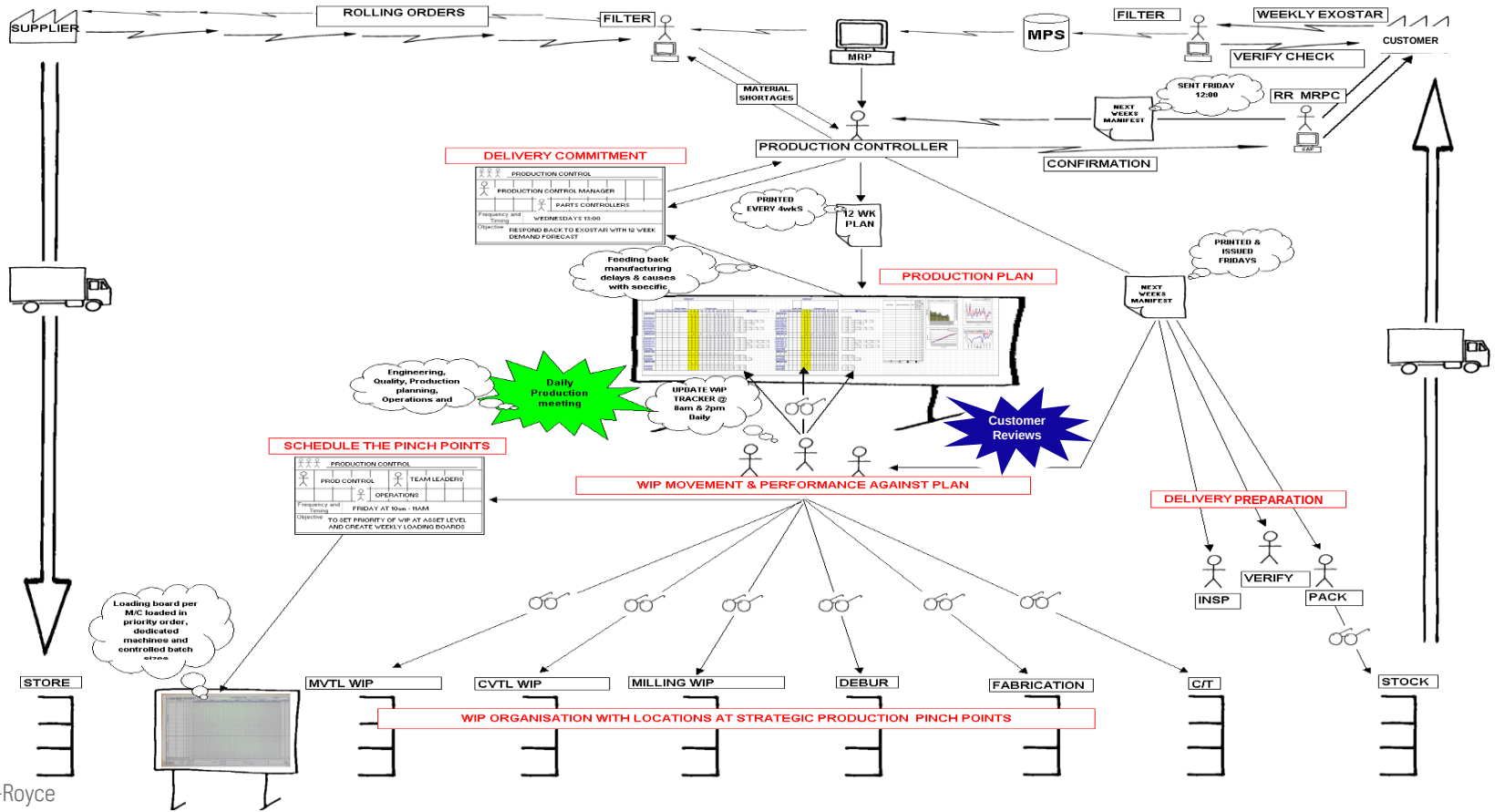
3) Effectively utilize people and plant

4) Deliver to requirement in full all the time

Objective and Principles



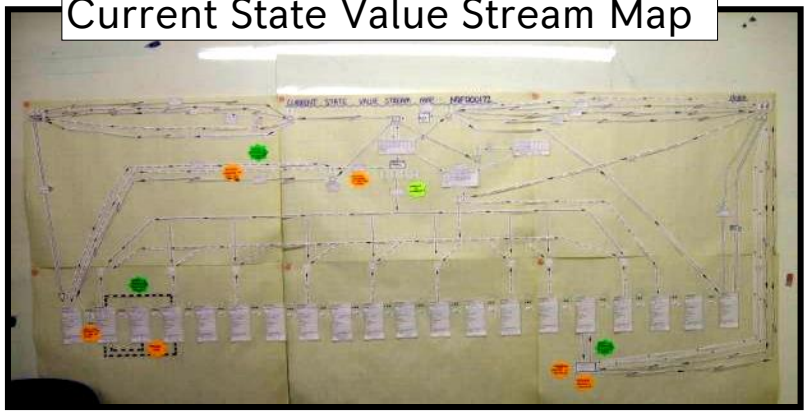
Objective and Principles



Prerequisites

- **Knowledge of:**
  - Diagnostic Process.
    - Load & Capacity
    - VSM & Lead Time Analysis
    - Signal Stability
    - Visual Management
    - Arrears information

Current State Value Stream Map



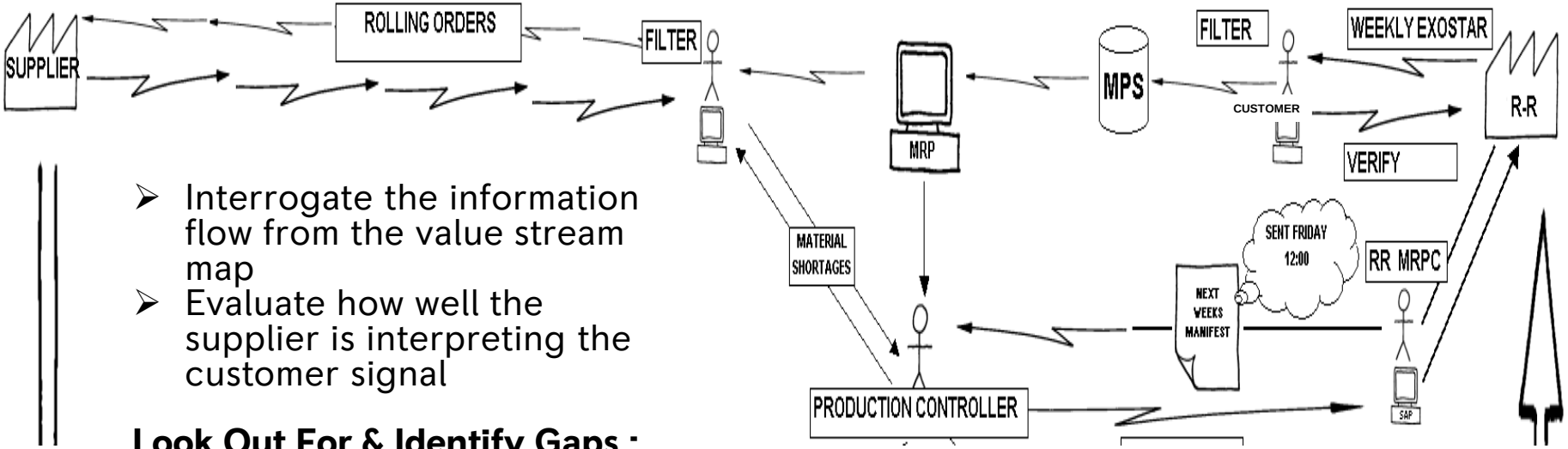
Baseline Current State

- How well is the customer demand interpreted?
- How good is the communication of the customer demand through the facility?
- How well is performance managed against customer demand?
- Bottlenecks identified

1. Understand customer demand and plan production

BACK Map NEXT

Understand communication links with the customer



- Interrogate the information flow from the value stream map
- Evaluate how well the supplier is interpreting the customer signal

Look Out For & Identify Gaps :

- Main source of communication with the customer
- Business system (MRP) is appropriately maintained (eg. routings & lead-times)
- Management of 12 week production plan
- Material Requirements Planning (MRP) management process
- Cross functional team working

1. Understand customer demand and plan production

Identify load and any arrears

LOAD PROFILE

Sum of Open Qty	Week												
Material	10	11	12	13	14	15	16	17	18	19	20	21	Grand Total
6860298			7										7
3A1566	10		10	8	10	10		10		10		10	78
6A2850						1							1
AG59197A				1									1
AX66111							1				1		2
AX67802					2				7				9
BR76625A						3							
BRR24558		5	5	5	5	5	5		5	5			
EU67093	6			7					6				
FK13249					1								
FK20002	3	4	3	1	2	3	4	4	3				
FK20003		7	3	3	2	3	4	4	3				
FK20004	4	5		1	2				2				
FK24110		7		1		1	1	4	1				
FK24111		2		1	1	2			1				
FK24112						2			1				
FK24599	3			3	2	1	1	3	2				
FK26546	1			1		1							
FK26886	1	1				1	1						
FK29332			1		1		1	1					
FW34102	6			5	5	5	5		5	5			

ARREARS LIST

KDB800051	21/03/2008	28/02/2007	1102	ENGB	1
RUB5069	25/02/2008	19/06/2007	2103	SPSM	1
UL33980	30/04/2008	26/06/2007	1202	ENGD	1
EU61964A	07/03/2008	18/09/2007	1103	SPSB	1
UL22313	29/03/2008	27/09/2007	1203	SPSD	2
UL22313	29/03/2008	16/10/2007	1203	SPSD	5
NQF001508	26/02/2008	09/11/2007	CBCC	RCV1	1
NQF001510	07/03/2008	09/11/2007	CBCC	RCV1	1
NQF001508	26/02/2008	16/11/2007	CBCC	RCV1	1
NQF001510	07/03/2008	16/11/2007	CBCC	RCV1	1
NQF001508	26/02/2008	23/11/2007	CBCC	RCV1	1
NQF001510	07/03/2008	23/11/2007	CBCC	RCV1	1
NQF001508	26/02/2008	30/11/2007	CBCC	RCV1	1
RUB5069	27/02/2008	30/11/2007	2103	SPSM	1
RUB5069	29/02/2008	30/11/2007	2103	SPSM	1
NQF001510	07/03/2008	30/11/2007	CBCC	RCV1	1
NJ193647	25/02/2008	07/12/2007	1102	ENGB	1
NQF001508	26/02/2008	07/12/2007	CBCC	RCV1	1
NQF001510	07/03/2008	07/12/2007	CBCC	RCV1	1
NQF001505	26/02/2008	14/12/2007	CBCC	RCV1	1
NQF001508	26/02/2008	14/12/2007	CBCC	RCV1	1
NQF001510	04/04/2008	14/12/2007	CBCC	RCV1	1
FK13249	22/03/2008	20/12/2007	1203	SPSD	1
NQF001505	26/02/2008	21/12/2007	CBCC	RCV1	1

Forward Load split into weekly buckets

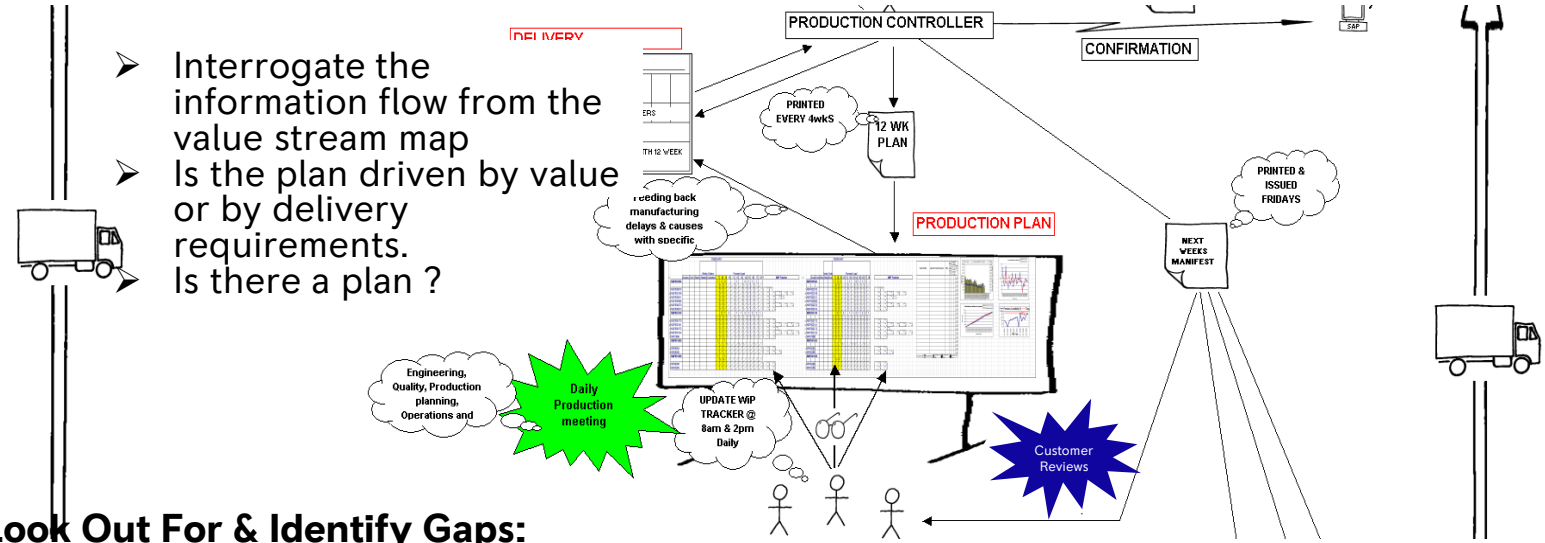
- Identify parts which are runners, repeaters, strangers & aliens
- Group part families
- Look for weeks with heavy/low demands across part portfolio
- Establish average weekly schedule line requirement

Arrears information retrieved

1. Understand customer demand and plan production

Identify any gaps in production planning

- Interrogate the information flow from the value stream map
- Is the plan driven by value or by delivery requirements.
- Is there a plan ?



Look Out For & Identify Gaps:

- How well the plan is communicated?
- How often is it changing?
- Is the plan reviewed on a daily basis, are risks mitigated?
- Do people have accountability for the plan to succeed?
- Are parts launched on time?

Weekly Production Plan (12 weeks)

	10	11	12	13	14	15	16	17	18	19	20	21
574740				1						1		
				1						1		
574751							5					
									5			
574756	2			2			2			2		
	1		2				2			2		
6860298	4			4	4		4	4		4		
	8				8				8			
3A1566	10	10	10	10	10	10	10	10	10	10	10	10
		10	10	10		10	10	10	10	10	10	10

This months requirements

1. Understand customer demand and plan production

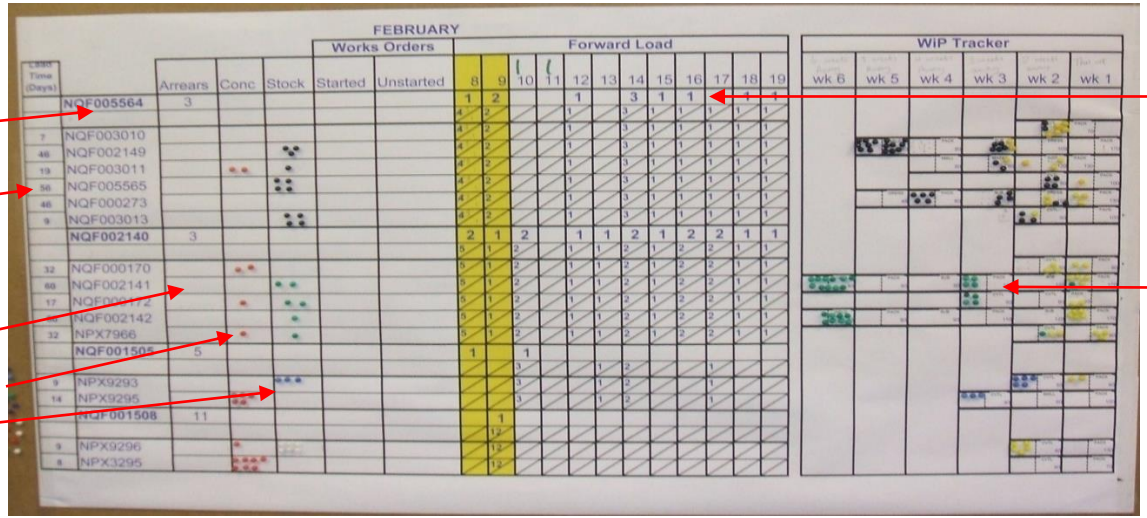
Manage problem parts

Visual management of part order status and problems (non-adherence to plan)

Part Sold

Details

Status:
- Arrears
- Concessions
- Stock



Load

W.I.P management

Kit parts and multi level assemblies usually cause additional problems due to increased complexity and the additional manufacture of detail parts.

- Highlights stock levels/status, order backmarkers, concession status and arrears
- Informs the requirement to launch, to Go-look-see and confirm the actual WIP status, and actions required / priorities to get back to plan

Gate checklist 1: Understand customer demand and plan production

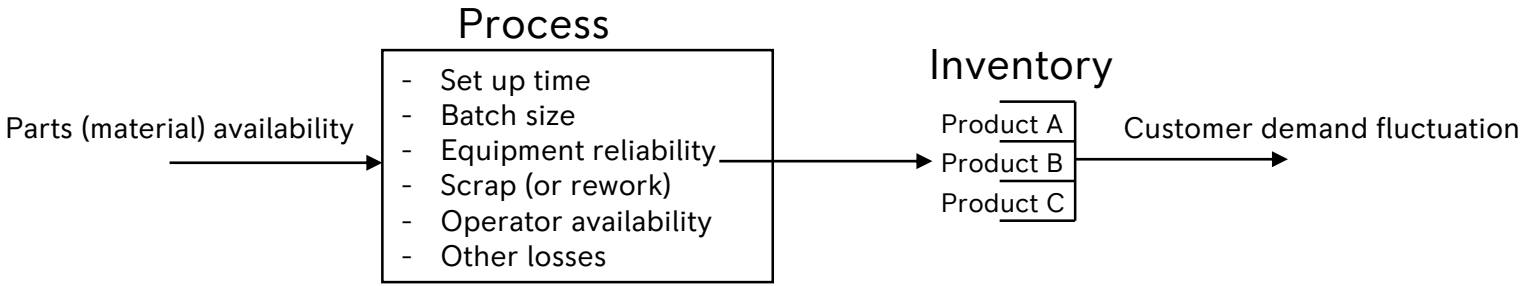
BACK Map NEXT

- ☑ Customer information and demand flow understood, with opportunities identified for improvement
- ☑ Load and any arrears identified
- ☑ Production planning process understood, with opportunities identified for improvement
- ☑ Part order status visually managed with management process in place

2. Production control and deliver process

Understand production control system aim

- A Production Control system should be designed to ensure customer requirements are always fulfilled
- To achieve this we need to understand the overall process chain capability and stability. The following factors may create the need for inventory;



- Appropriate levels of inventory need to be held at relevant points in the manufacturing/ assembly process according to the current capability and stability
- For parts which have a frequent customer demand

$$\text{Manufacturing lead-time} = \frac{\text{Quantity of WIP}}{\text{Customer demand per period}}$$

- In the case of low customer demand parts, the quantity of WIP may become negligible, and in some cases it becomes appropriate to make-to-order

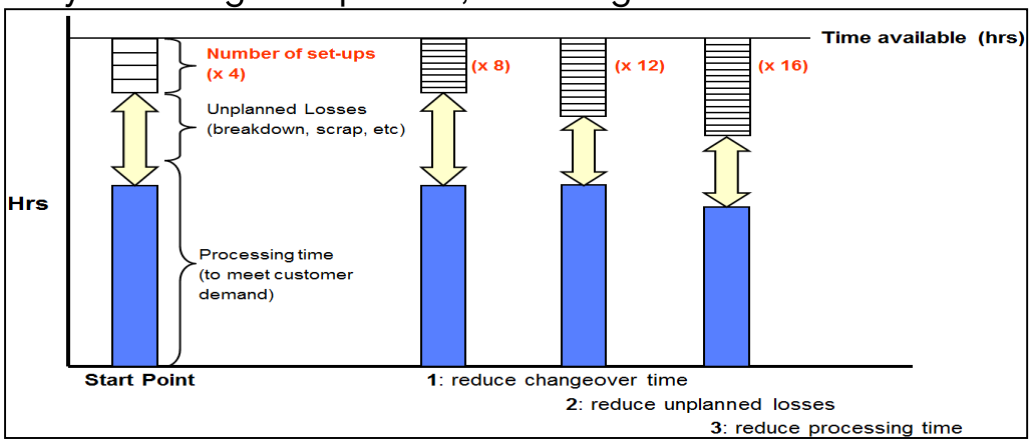
2. Production control and deliver process

Understand production control system aim

The benefits of shorter lead-time

- Reduced inventory and associated costs
- Less inventory enables a simple visual production that is easier to manage
- The challenge is to improve our capability and stability, so that lead time and inventory can be reduced without jeopardising on time delivery to our customers by
  - simplifying process flow (eg. dedicating parts/part families to machines)
  - progressing towards single piece flow by reducing set up times, reducing batch sizes and reducing unplanned stoppages

- To move towards single piece flow we need to reduce batch size (ie. increase number of changeovers), whilst achieving customers orders



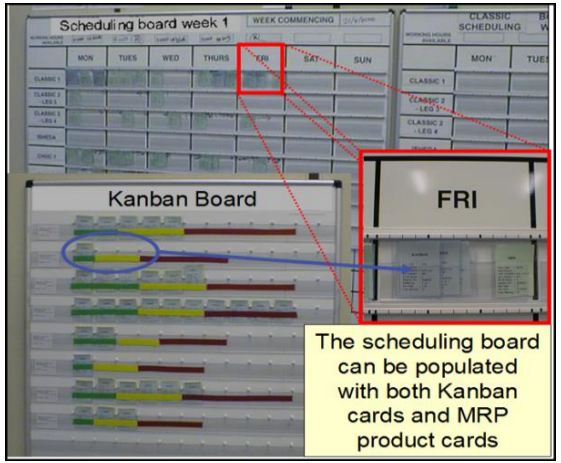
2. Production control and deliver process

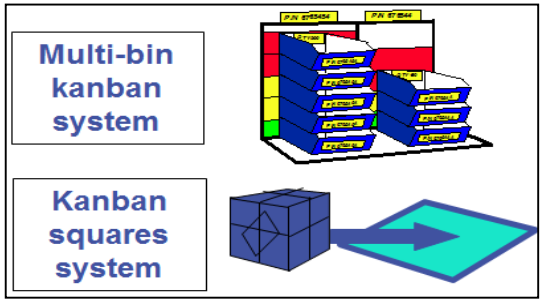
BACK Map NEXT

Understand production control system aim

Understand how Kanban (pull) works and when it is the appropriate control technique

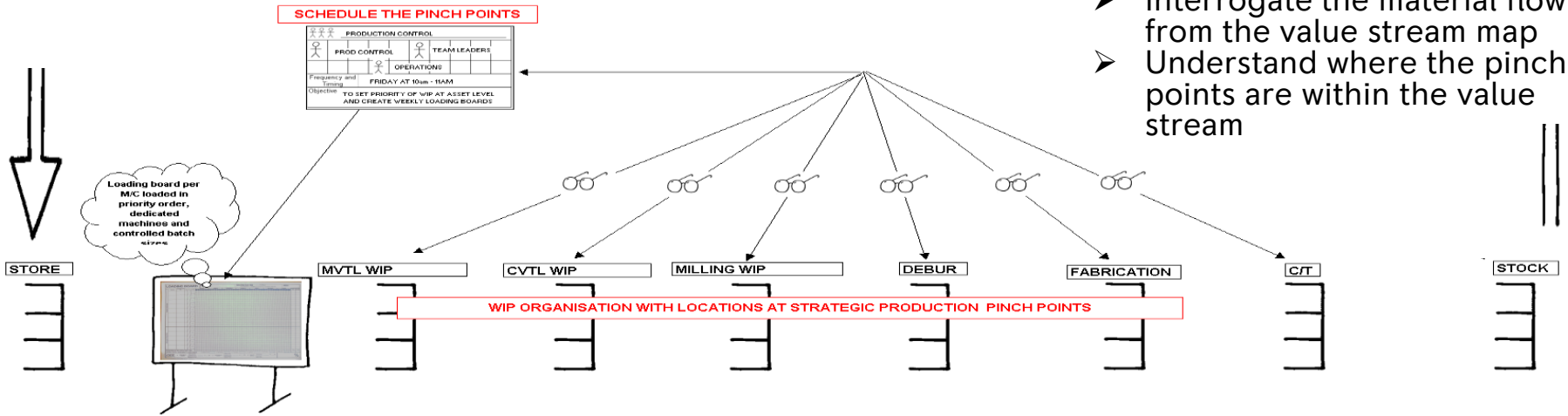
- A Kanban (Japanese for a pull) system of stock replenishment in a capable/stable environment has many advantages
  - inventory reduction
  - a simple operation using clear visual signals
  - low administrative cost
  - responsive to demand
- In a Kanban system the customer (internal/external) sends a signal to the supplying area – eg. a Kanban card, red/amber/green level indication, empty square
- All these techniques replenish stock with a pre-determined “Kanban quantity” as the stock is consumed
- The total number of Kanban's for each part is pre-set and adjusted at intervals to reflect changes to expected volumes and product mix





2. Production control and deliver process

Control at the asset level



- Interrogate the material flow from the value stream map
- Understand where the pinch points are within the value stream

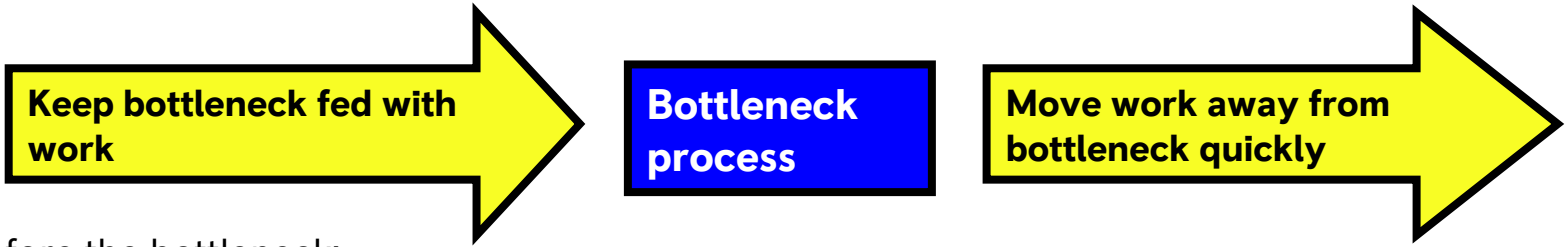
Look Out For & Identify Gaps:

- How well is the segregation and storage of WIP around the facility?
- Is asset planning effective?
- Is asset performance reviewed or understood?
- Look there overproduction, large/variable batch sizes
- How are work queues prioritised?
- Are fixtures stored locally and easily identified?
- How well is the labour deployed?
- Are assets seem to idle for long periods of time?
- How well are the sub-contract providers controlled?

2. Production control and deliver process

Asset planning at the bottleneck

- The process should be designed such that the bottleneck operation is kept running (i.e. so that work is always available at the process bottleneck; and such that thereafter work is quickly carried away from the bottleneck process).



Before the bottleneck:

- Plan to hold inventory so that the constraint machines will not lose time waiting for work – typically it is necessary to size the buffer to allow for variations in cycle time between one part and another (the bottleneck machine will not always be the slowest operation for every part) and for interruptions on earlier machines (for example due to breakdowns)
- The inventory may be held immediately ahead of the bottleneck machine or may be held ahead of the group of machines if the earlier operations in the group are reliable and always faster than the constraint operation

2. Production control and deliver process

Asset planning at the bottleneck

TAKE CONTROL AT THE BOTTLENECK, PLAN THE ASSET FOR A WEEK IN LINE WITH CUSTOMER DEMAND & MAXIMISE CAPACITY

PRODUCTION PLAN AT BOTTLECK PROCESS

DAILY PERFORMANCE REVIEWS

Cross-functional team working

PROBLEM FOLLOW-UP

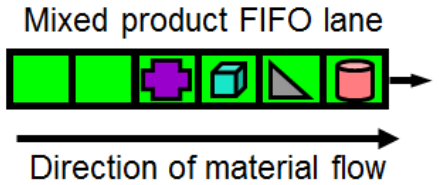
QUALITY CONCERN TRACKING SHEET

- Controlling batch sizes
- Setting order & priorities
- Dedicating parts to assets
- Deploying labour
- Understand performance against plan
- Review performance
- Manage problems

2. Production control and deliver process

Organise and visually control work at the bottleneck

- Segregate WIP and identify storage locations
- Consider material movement, safety & potential damage risks
- Limit space to requirement and implement control system
- First-In, First-out (FIFO) is a control mechanism used to ensure work flows through a process in a specific sequence
- FIFO Lanes – provide a visible mechanism for defining which part(s) to work on next

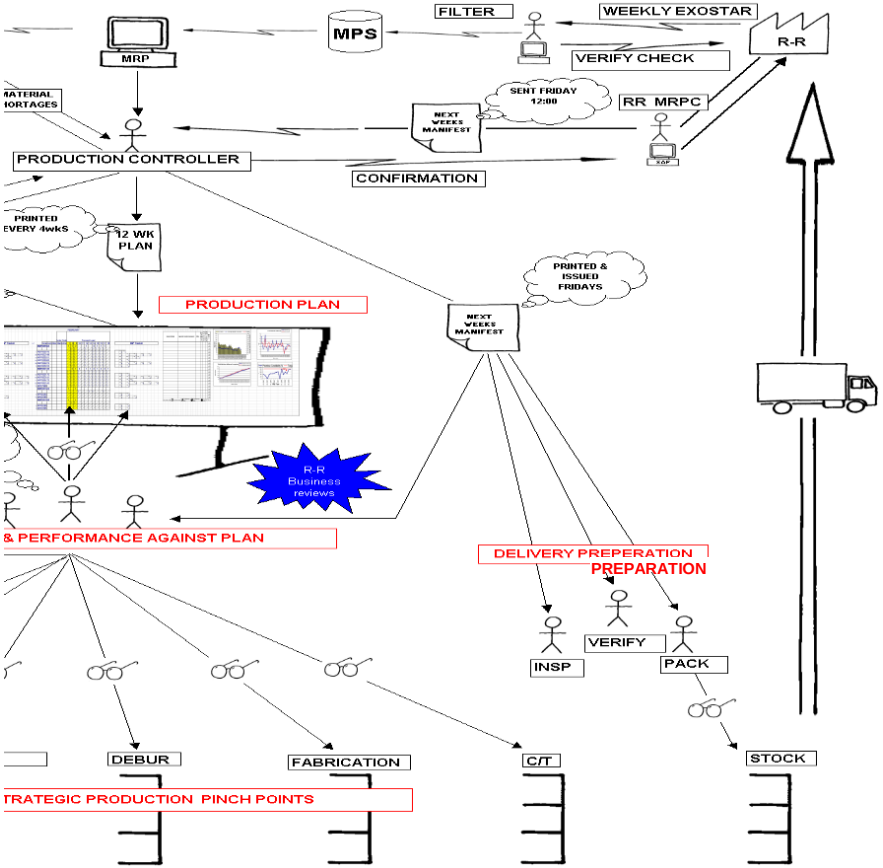


2. Production control and deliver process

BACK Map NEXT

Delivery process

- From the information flow from the value stream map, what is the delivery preparation and delivery process?



Look Out For & Identify Gaps:

- How good is the logistics delivery process?
- What is the actual performance vs. plan?
- Are parts awaiting delivery organised?
- How are parts controlled from stock?

Gate checklist 2: Production control and deliver process

BACK Map

- ☑ Production control aim is understood
- ☑ Production control system is analysed, with opportunities identified for improvement
- ☑ Asset planning and management in place at the bottleneck
- ☑ Work is visually organised at the bottleneck with appropriate control in place (eg. FIFO)
- ☑ Delivery process is understood, with opportunities identified for improvement