

A photograph of a forest with tall trees and green grass. A semi-transparent grey banner is overlaid across the middle of the image.

Willkommen bei Verbesserungskata.de

Value Stream Mapping

**A Holistic Method for Deploying Challenging Target
Conditions that our Teams can strive for using
the Improvement and Coaching Kata**

Why do we need Value Stream Mapping?

How do we use VSM to deploy
challenging Target Conditions?



Kata needs Value Stream Mapping in order to make sure our **Target Conditions are aligned** from the very beginning



Three stages of progress in the development of a scientific improvement organization with Toyota Kata

1. „What could be improved?“ results in...

Measure	Who?	By when?	Status
a- Floor markings	Mr. Müller	8.07.2009	⊕
b- Move machine	Mrs. Heine	1.09.2009	⊕
c- Improve tooling	Mr. Wagner	12.09.2009	⊕

Hmmm ... on this measures list there are no expected numerical outcomes!
So, all I can measure is the implementation of each measure

How could I know whether the expected impact has been achieved if I have not defined the expected outcome first?



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1. „What could be improved?“ results in...

Measure	Who?	By when?	Status
a- Floor markings	Mr. Müller	8.07.2009	⊕
b- Move machine	Mrs. Heine	1.09.2009	⊕
c- Improve tooling	Mr. Wagner	12.09.2009	⊕

Savings: € 7.000



Hehehe! They could have saved € 10.000 if they just would have omitted measure C altogether!

What no one has noticed:

a: € 5.000 saved

b: € 5.000 saved

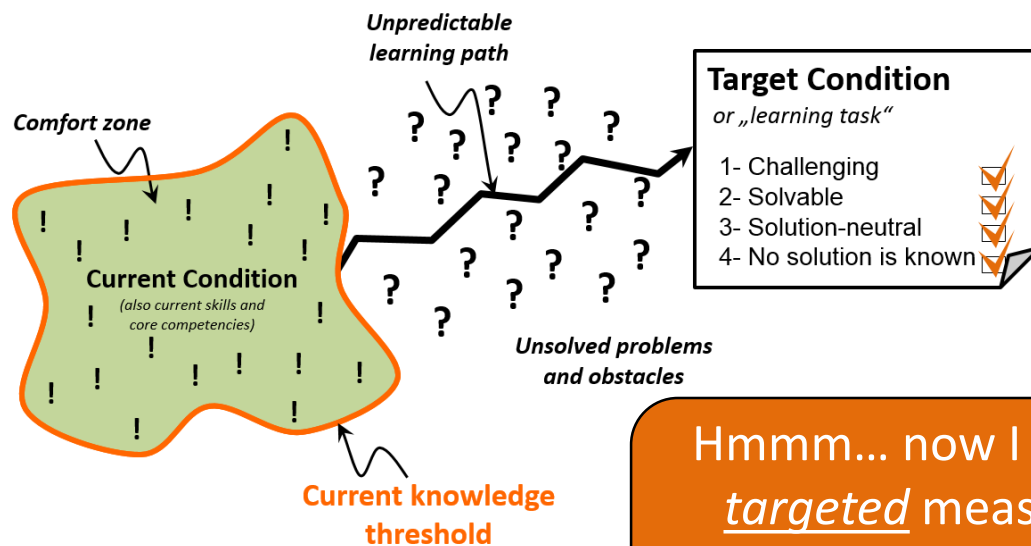
c: € 3.000 extra costs!



Three stages of progress in the development of a scientific improvement organization with Toyota Kata

2. „What should be improved?“ results in...

Definition of measurable Target Conditions



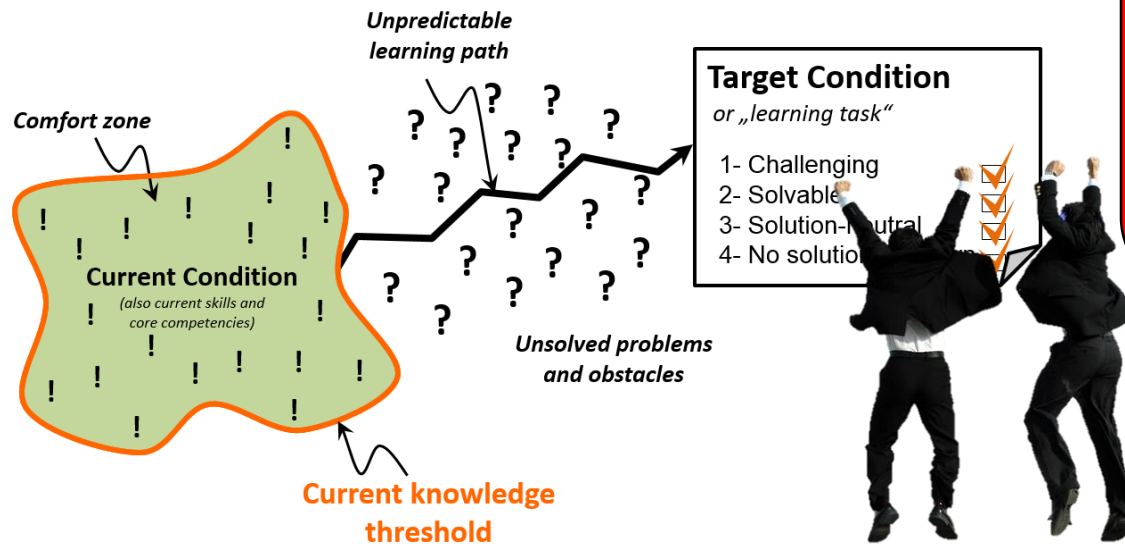
Hmmm... now I can derive targeted measures and examine the expected impact individually !



Three stages of progress in the development of a scientific improvement organization with Toyota Kata

2. „What should be improved?“ results in...

Definition of measurable Target Conditions



Hehehe! They might reach their goals, but these are counterproductive and ineffective, since they have not been derived systemically!



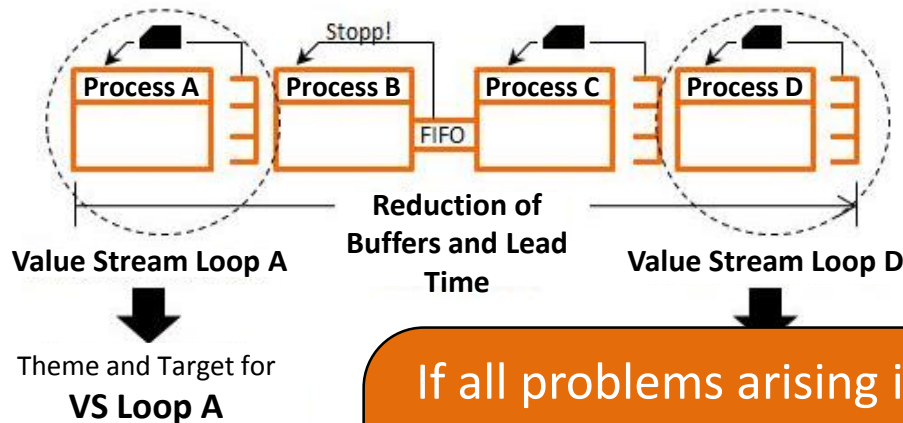
What no one has noticed:

Our ROI-based management system tries to manage complexity by dividing the system in smaller parts and trying to improve them separately. Optimizing each part of a system independently won't lead to the overall optimum. On the contrary, we know from Systems Theory that eventually the whole system will get destroyed by doing so!

Three stages of progress in the development of a scientific improvement organization with Toyota Kata

3. „What should be improved?“ results in...

Derivation of measurable Target Conditions



If all problems arising in a factory result in Buffers and Increased Lead Time, then reducing Lead Time should be the overriding activity to improve factories in a holistic, systemic way!



Why do we need Value Stream Mapping?

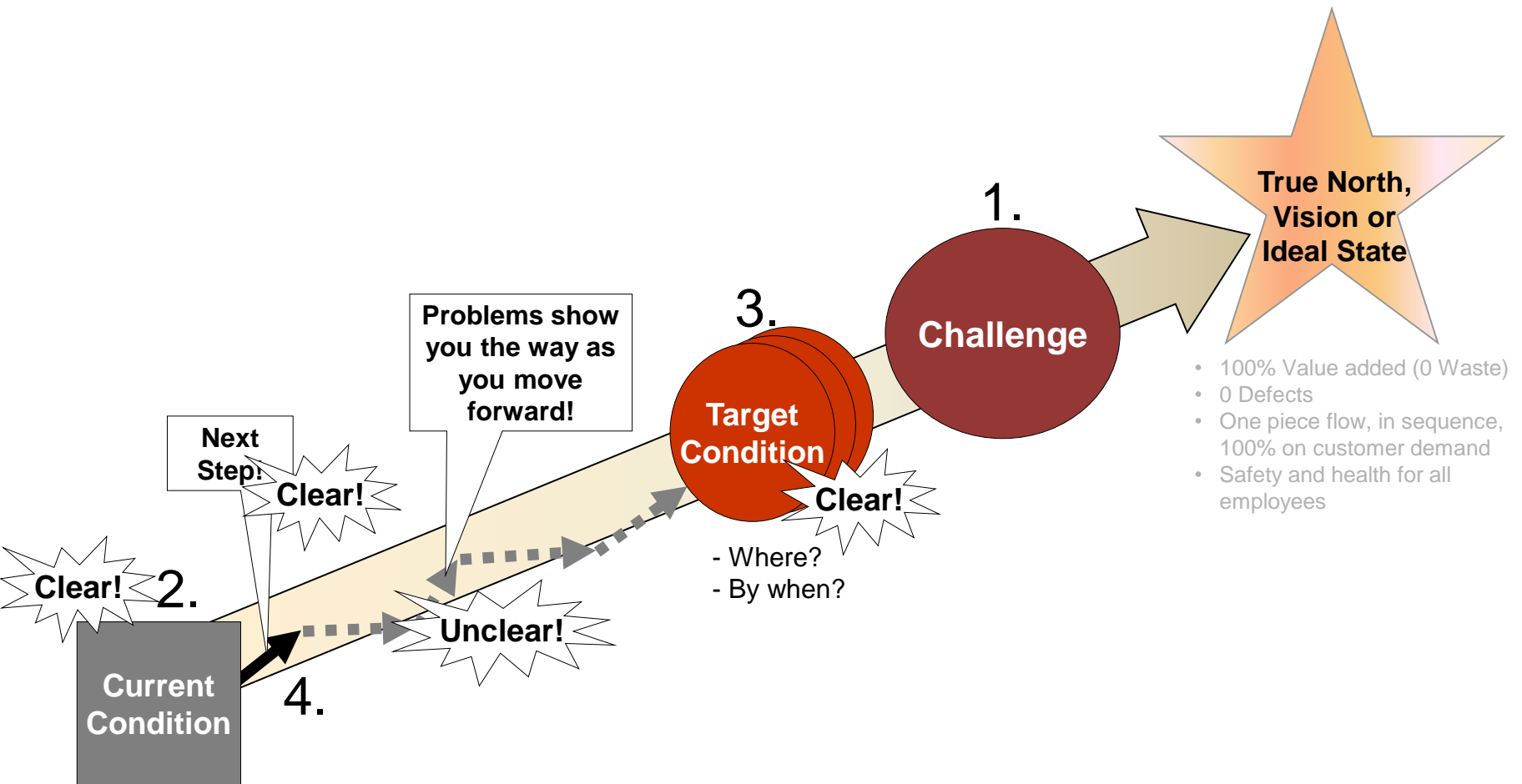
How do we use VSM to deploy
challenging Target Conditions?

Purpose of this course

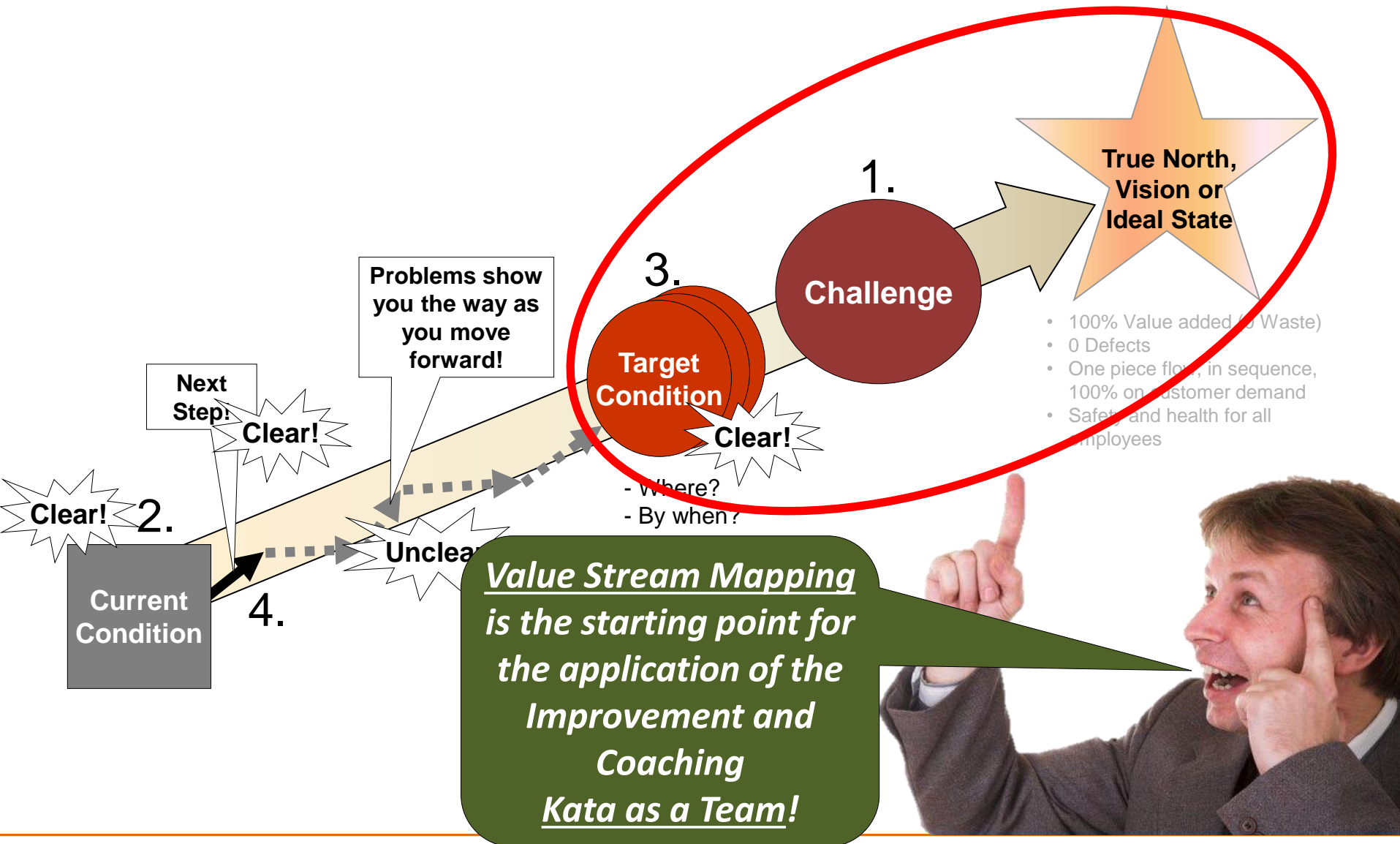
- To develop our ability to see value streams and to design highly efficient, customer-oriented value stream maps.
- To practice the value stream mapping method just using a pencil and a sheet of paper.



Target Conditions should be derived from an **overarching Challenge** which itself should be derived from a **Vision** or **True North**

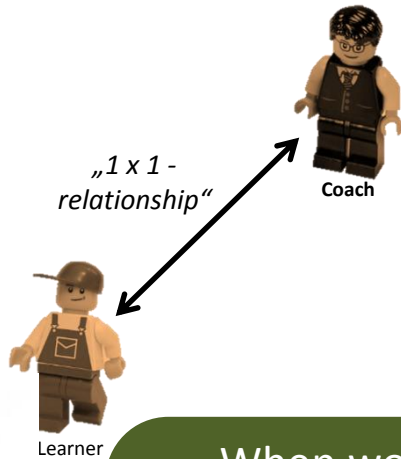


Value Stream Mapping helps to **Align an Organization** by giving a shared, overarching challenge derived from the True North



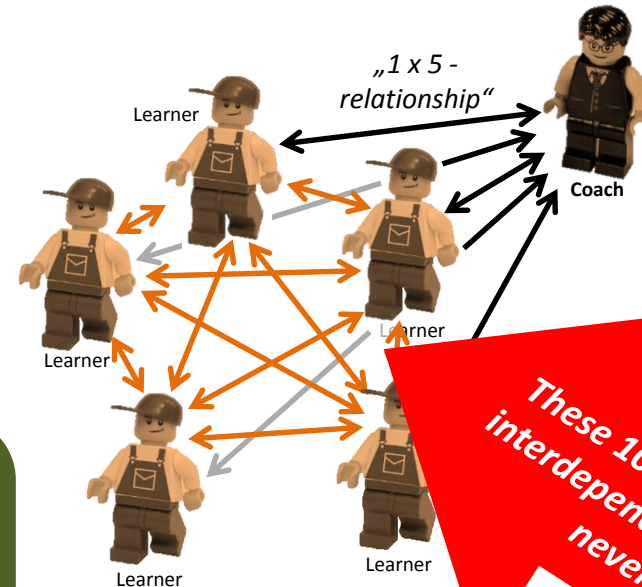
Interdependencies among Learners grow geometrically with increasing project team size, so **synchronizing their targets is key!**

Coaching One on One One Target Condition involves just One Learner



When working in a Kata project team an increasing number of obstacles affecting me lie in the responsibility of one of my team-mates!

Coaching Many One Target Condition involves Several Learners, who depend on and influence each other

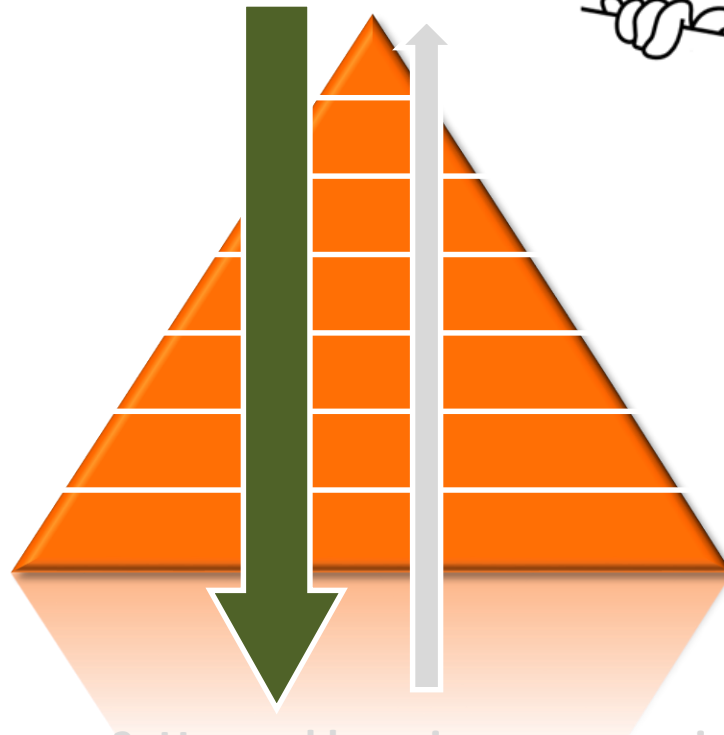


These 10 (!) new, orange interdependencies should never be ignored!

All Targets are deployed „Top down“ across hierarchy levels and agreed upon along the Chain of Coaching

1. Target Deployment

„Top-Down“
(mathematically linked!)



2. Upward learnings communication

„Bottom Up“
(mathematically linked!)

Mathematically coherent **Target Deployment Process** with Target-Forms at all levels

T-Form

④ Value Stream Manager

4-T-Terminal	Freien	Zahlweise fortführung	Coach	Erbschaft	Mantel	Stoff Flasche
Kannsch		10-Terminal				
Kleinfeld		10-Terminal				
EDS (Starg Part Eury Internat)		10-Terminal				
Anzahl variable		10-Terminal				
Anzahl Mängelungen zu EDS		10-Terminal				
Anzahl deklarieren zu Mängel		10-Terminal				

Target outcome for **Value Stream Manager and Coach**

9-18 Months into the future

[illegible]

Themes and Process Targets for *Process Improver*

Mathematical link across all hierarchical levels

T-Forms

③ VS-Loop-Manager

5. Formel	Prozess	Gesamt	MA
	Ist-Zustand		Ziel-Zustand
Ist-Eingangs- Produktion	Ist-Auflage MA =		Ziel-Eingangs- Produktion
			Ziel-Produktion
Brutto-Arbeitszeit Pausen = Aktueller Bedarf =			Brutto-Arbeitszeit Pausen = Aktueller Bedarf =
NWZZ = Arbeitszeit Soll = Kundenstell = Montagezeit = Störungsanteil = Ist-Arbeitszeit = Überzeit =			NWZZ = Arbeitszeit Soll = Kundenstell = Montagezeit = Störungsanteil = Ist-Arbeitszeit = Überzeit =

9-18 Months into the future

9-18 Months into the future

NWZ-Z. =
Arbeitszeit Soll =
Kundenbeitrag =
Montagezeit =
Störungsanteil =
Ist-Arbeitszeit =

NWZ-Z. =
Working time Soll =
Customer contribution =
Assembly time =
Incident share =
Actual working time =

Target outcome of VS-Loop-Manager

Arbeitsplan	Prozess	Gesamt	Minuten
	Ist-Zustand		Ziel-Zustand
Ist-Eingangs-MA	Ist-Anzahl MA		Ziel-Eingangs-MA
Ist-Prozess			
	Brutto-Arbeitszeit:		Brutto-Arbeitszeit:
	Pausen =		Pausen =
	Aktueller Bedarf =		Aktueller Bedarf =
	NWZ =		NWZ =
	Arbeitszeit Spil =		Arbeitszeit Spil =
	Kundenloft =		Kundenloft =
	Montagezeit =		Montagezeit =
	Störungsanzahl =		Störungsanzahl =
	Ist-Arbeitszeit =		Ist-Arbeitszeit =
	Übersitz =		Übersitz =

T-Formulare

② Process improver (and its ① Team)

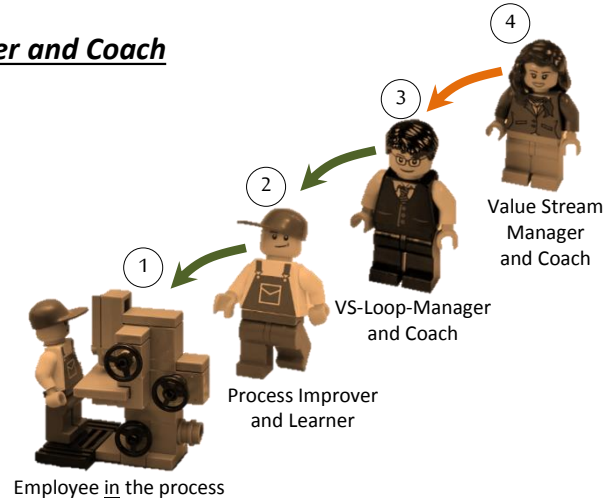
5. Formel	Prozess	Geht	MA
	Ist-Zustand		Soll-Arbeitszeit MA
Ist-Eingangs: (in Prozess)	Ist-Arbeitszeit MA =	Ziel-Eingangs: (Ziel-Prozess)	
	Brutto-Arbeitszeit Pausen = Aktueller Bedarf =		Brutto-Arbeitszeit Pausen = Aktueller Bedarf =
	NWZ = Arbeitszeit Soll = Kundenbeitrag = Montagezeit = Störungsanteil = Ist-Arbeitszeit = Überschitt =		NWZ = Arbeitszeit Soll = Kundenbeitrag = Montagezeit = Störungsanteil = Ist-Arbeitszeit = Überschitt =

2-5 Weeks into the future

A. 7. Terminplan		Prozess	Capex	Minuten
		Ist-Zustand		
Ist-Organigramm		Ist-Arbeitszeit: MA =		Soll-Arbeitszeit: MA =
Ist-Prozess			Ziel-Organigramm	
		Ziel-Prozess		
Brutto-Arbeitszeit:		Brutto-Arbeitszeit:		
Pulsen =		Pulsen =		
Aktueller Bedarf =		Aktueller Bedarf =		
NWZ-Z =		NWZ-Z =		
Arbeitszeit Soll =		Arbeitszeit Soll =		
Kundenbezug =		Kundenbezug =		
Montagszeit =		Montagszeit =		
Störungsanteil =		Störungsanteil =		
Ist-Arbeitszeit =		Ist-Arbeitszeit =		
Übersch =		Übersch =		

A-Tabelle	Prognose	Gegen	Monette
	Ist-Anzahl		Soll-Anzahl
Ist-Gehalt	Ist-Anzahl \cdot MA =		Soll-Gehalt \cdot MA =
Ist-Prozess		Der Prozess	
	Brutto-Arbeitszeit: Pausen: Arbeitszeit =		Brutto-Arbeitszeit: Arbeitszeit Bedarf =
	Kundenanzahl =		MAVZ =
	Montagezeit =		Kundenanzahl Soll =
	Störungsanzahl =		Auslastungs =
	Ist-Arbeitszeit =		Montagezeit =
	Überzeit =		Störungsanzahl =
			Ist-Arbeitszeit =
			Überzeit =

A-Tabellen	Prozess	Graph
<p>1. Ist-Zustand</p> <p>Ist-Prozess: Ist-AvZuZoll_MA ==</p> <p>Brutto-Arbeitszeit: Pausen = Aktueller Bedarf =</p> <p>NWZZ = Arbeitszeit Soll = Kundenabg = Montagezeit = Störungsanteil = Ist-Arbeitszeit = Überzeit =</p>	<p>2. Soll-Zustand</p> <p>Soll-Prozess: Soll-AvZuZoll_MA ==</p> <p>Brutto-Arbeitszeit: Pausen = Aktueller Bedarf =</p> <p>NWZZ = Arbeitszeit Soll = Kundenabg = Montagezeit = Störungsanteil = Ist-Arbeitszeit = Überzeit =</p>	



Example of **Target deployment board** with four hierarchy levels including Plant-, Value Stream-, VS-Loop- and Process-Targets

1- Plant Targets

(Costs, Output, Headcount)

2- Value Stream Targets

(Lead times, Buffer stocks)

3- VS-Loop Targets

(EPEI, Change over frequency)

4- Process Targets

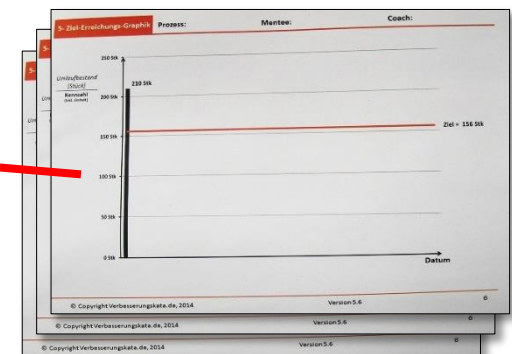
(C/O times, cycle times, downtimes u.v.m.)



4-1 Formular-Rechner - RTM SA

Kennzahl	RTM SA	
	1st-Zustand Datum: 01.01.14	Ziel-Zustand Datum: 31.12.15
Anzahl Mitarbeiter/Arbeitsplatz	2 MA/5A	1 MA/5A
Bedarf/Jahr oder der Prod.Assoziation	27.500 Stk/Jahr	27.500 Stk/Jahr
AT/Jahr	212 AT/Jahr	212 AT/Jahr
Bedarf/Tag	130 Stk/AT	130 Stk/AT
Produktionszeit im Prozess + SNIP 7 Tagebedarf	ca. 2,3 AT	2.880 Min
Brutto Arbeitszeit/Tag	1.440 Min/AT	1.440 Min/AT
Prozent/Tag	0 Min/AT	0 Min/AT
Netto Arbeitszeit/Tag - Brutto AT - Pausen	1.440 Min/AT	1.440 Min/AT
Kundenzeit (KT) + Netto AT / Bedarf pro Tag	666,1 Sek/Stk	666 Sek/Stk
Stückzahl/Tag - AT _{max} / Ziel Stückzahl	198 Min/AT	72 Min/AT
Küstenzeit	5%	5%
Küstenzeit/Tag	90 Min/AT	86 Min/AT
Anzahl Varianten	1 Varianten	1 Varianten
EPEI (Days from Every material) - n. 1 Tag	1,0 AT	1,0 AT
Minimale Losgröße - EPEI x Lagerbedarf/Varianten	130 Stk/Los	130 Stk/Los
Rüstvorgänge/Tag - Anzahl Varianten/EPEI	1,0 Rüstvorgänge/AT	1,0 Rüstvorgänge/AT
Nettozeit - n. 1 Tag - n. 1 Tag - n. 1 Tag	80,0 Min/Rüstvorgang	80,0 Min/Rüstvorgang
Nettozeit (ungestört) - Nettozeit - n. 1 Tag	532,8 Sek/Stk	592,8 Sek/Stk
Nettozeit (ungestört) - Nettozeit - n. 1 Tag	1.152 Min/AT	1.152 Min/AT
Nettozeit (ungestört) - Nettozeit - n. 1 Tag	80%	80%
Nettozeit (ungestört) - Nettozeit - n. 1 Tag	1005,8 Sek/Stk	592,8 Sek/Stk
Nettozeit (ungestört) - Nettozeit - n. 1 Tag	273 Stk	273 Stk

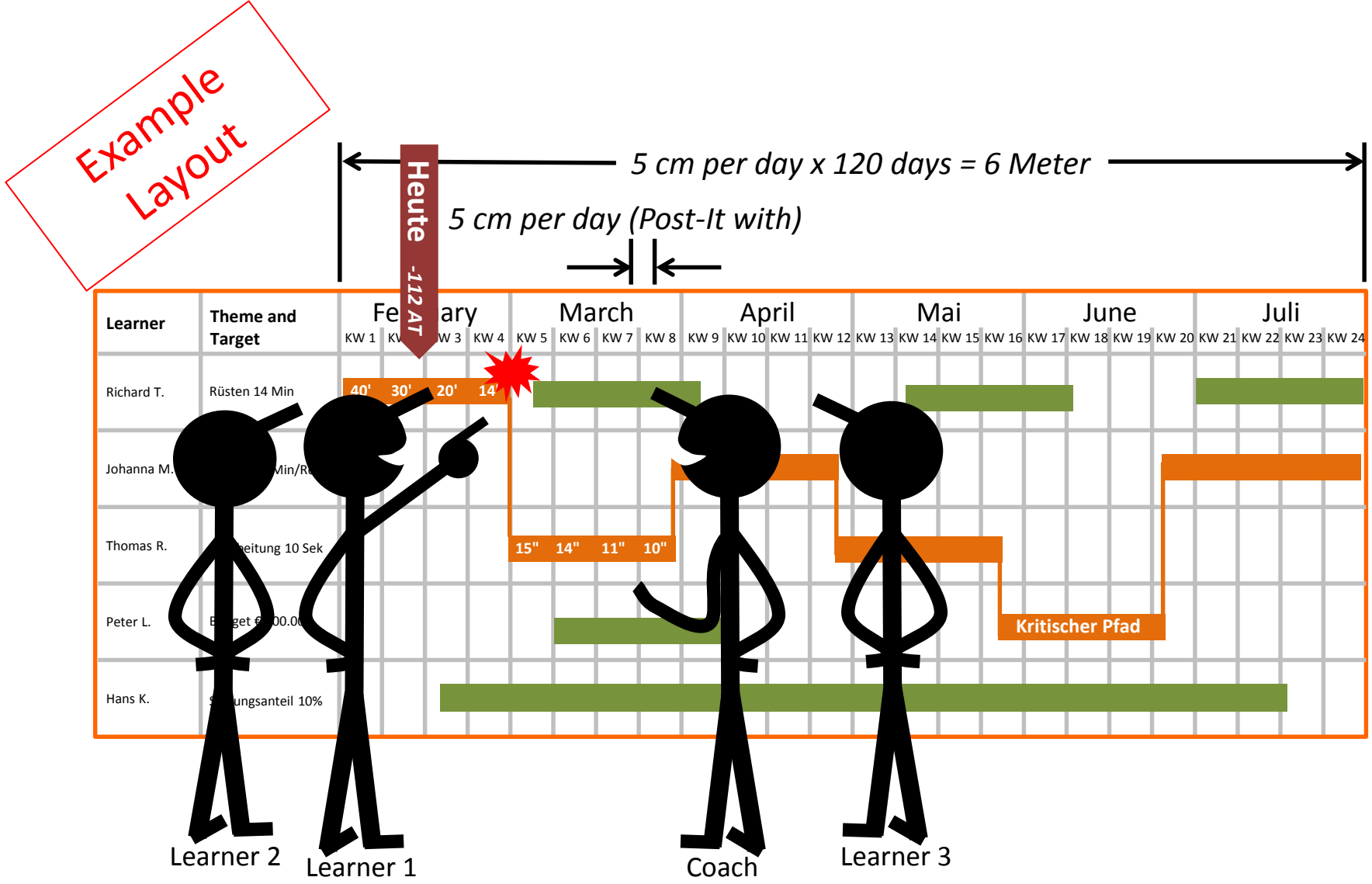
Target sheet,
(1 per VS-Loop) defined using
Excel-Target-Condition-Calculator



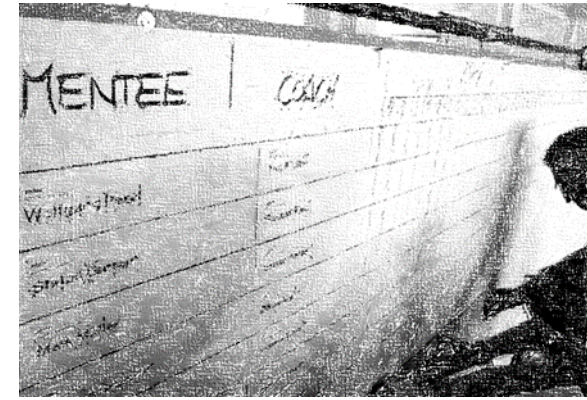
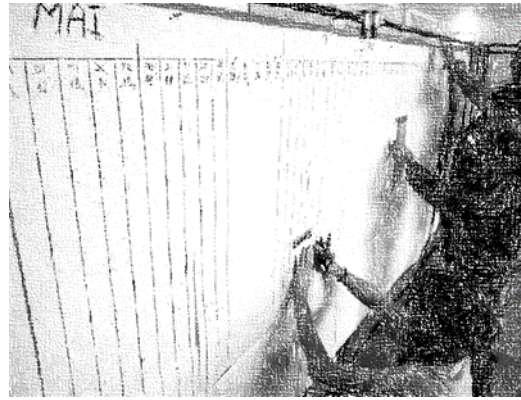
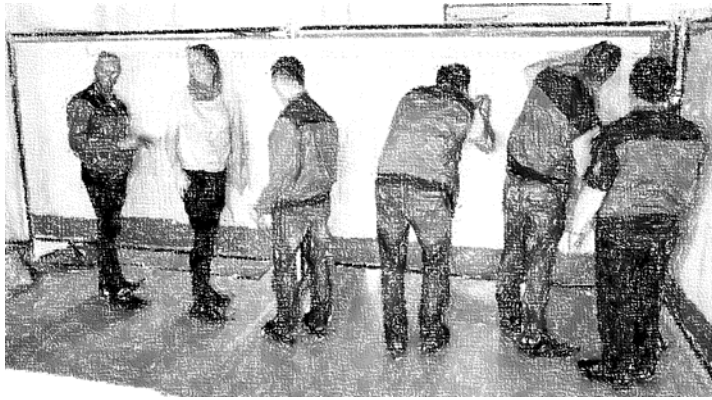
Out of the VS-Loop targets targets at the Process level are defined. A run chart per KPI is hung below and should be filled out on a daily basis.

A Target-deployment-board is many meters wide and is used on daily group coachings that take place in a sort of „war room“.
(This board should be adapted over time to your organization's needs and improve for better visualisation and usability)

Daily at 11:00 **Group coachings at the Upward-Communication-Board** take place, to recognize small problems and time delays



A first prototype of an **Coaching Summary Board** made out of flipchart paper, each learner can see his daily targets on it



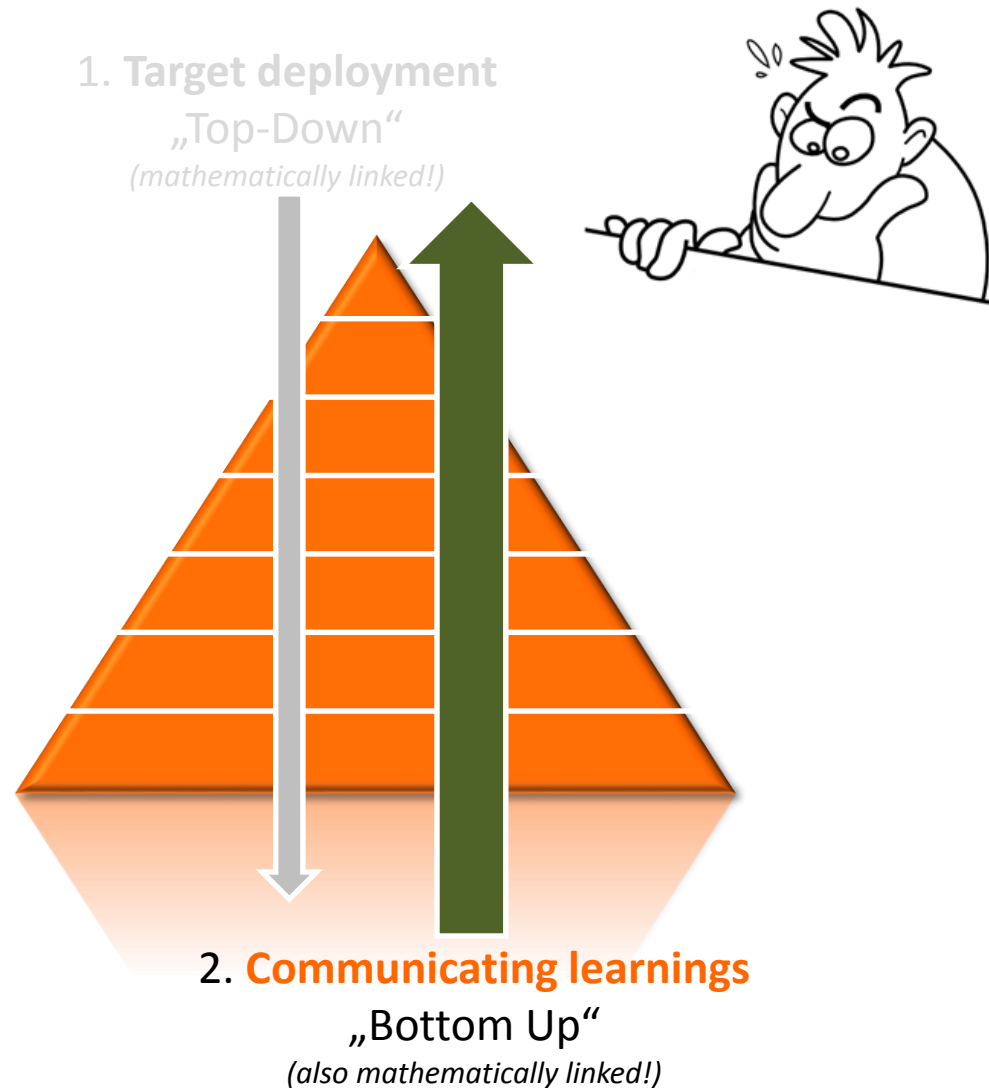
Example.: 20 days x 9 months x 5 cm = 9 meters

Kata-Coachings „as an orchestra“ must be **synchronised**

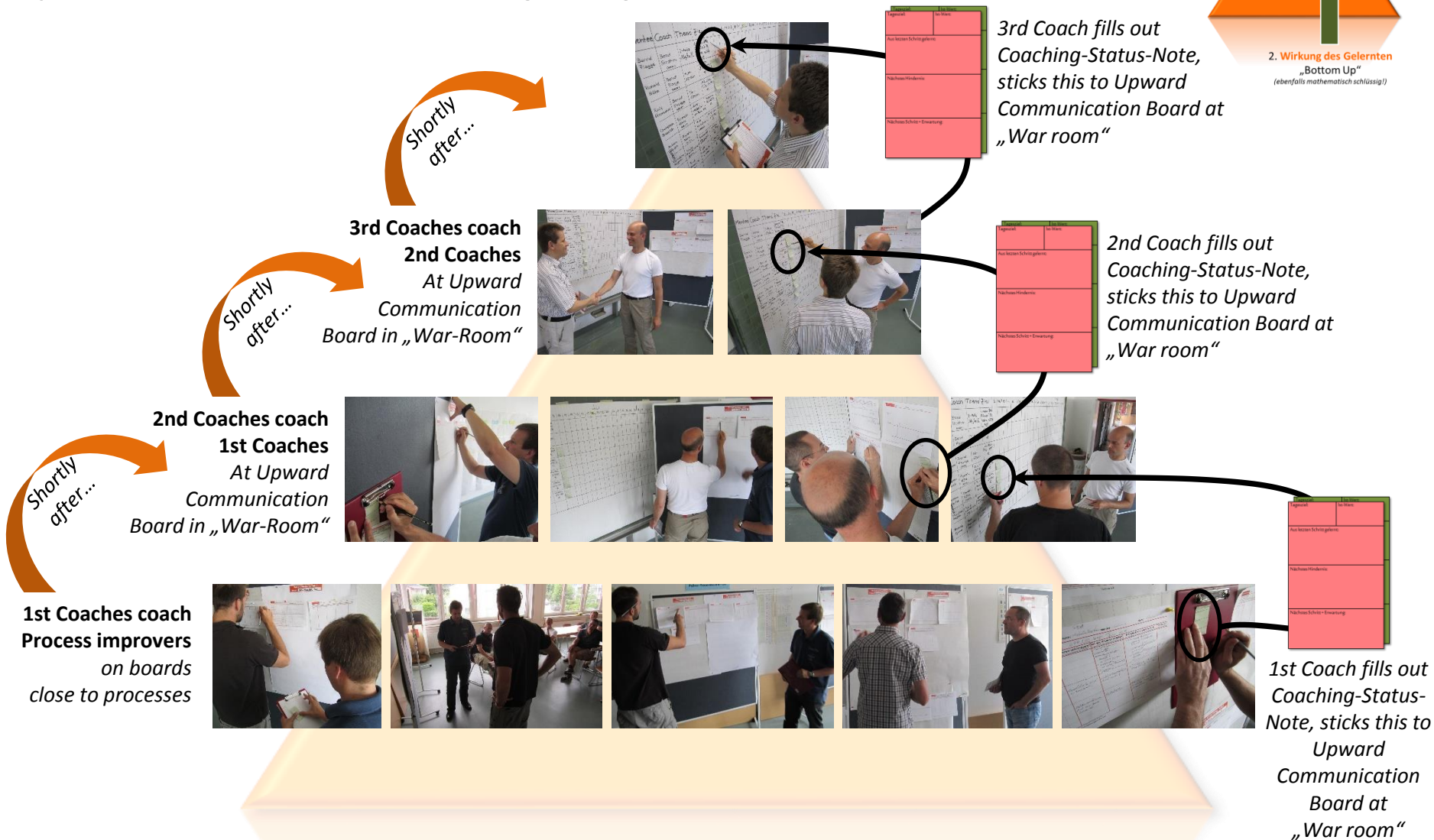
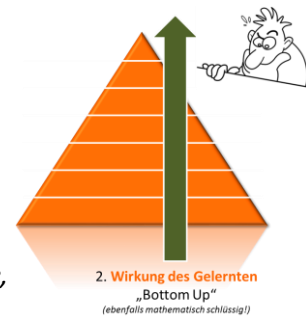
We can only sound good if each one of us sticks to one and the same **takt** (nobody to fast, nobody to slow!) when delivering his own part contribution to the project!



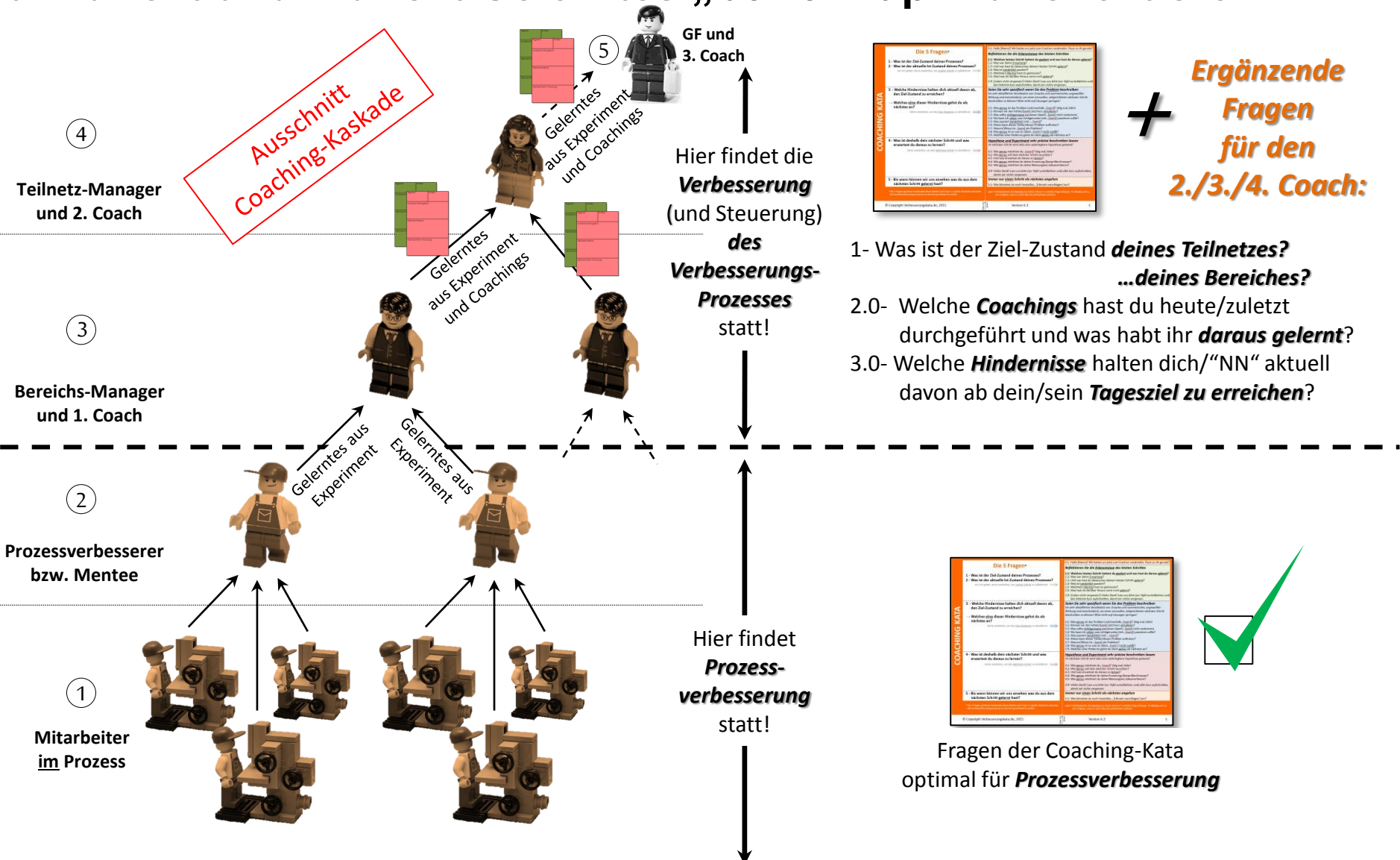
After all targets have been deployed, the „Bottom Up“- Information flow up the Chain of Coaching begins



And this is how the **Bottom Up Cascade** works in just a few hours every day...

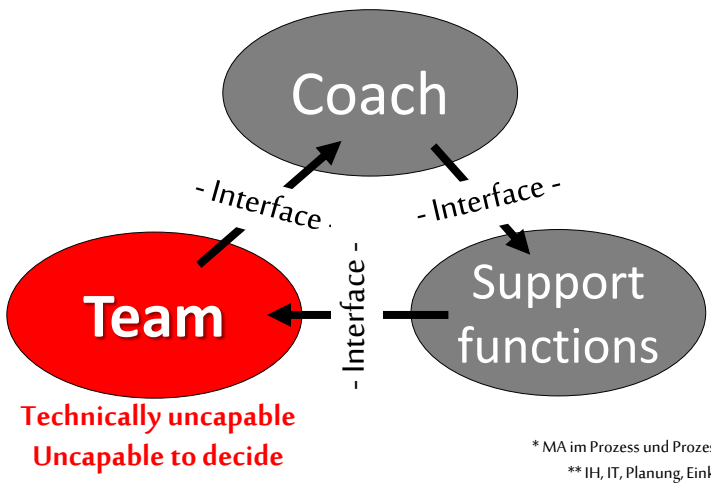


Leicht **geänderte Coaching-Fragen** in Teilnetz- und Bereichs-Ebene um direkt und indirekt Gelerntes „bottom up“ zu reflektieren



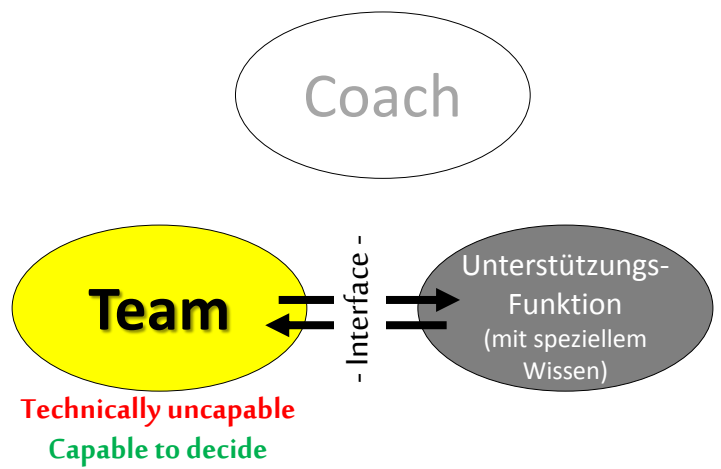
Hohe Reaktionsfähigkeit und Verbesserungsgeschwindigkeit bedarf **hohe Autonomie der Verbesserungsteams** am Prozess

1- Lowest Autonomy and Problem solving competence

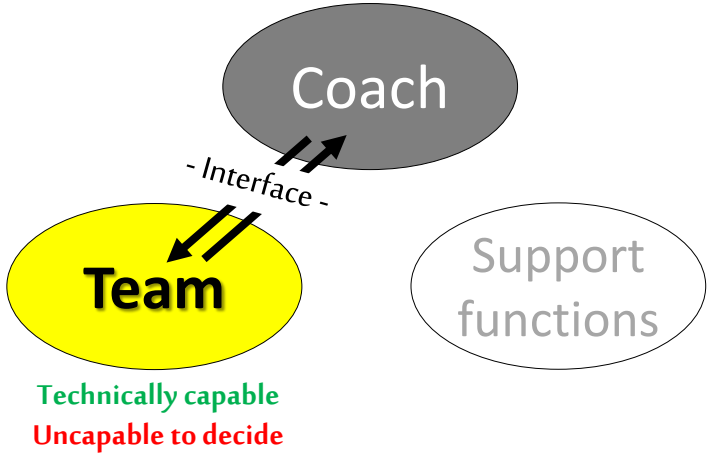


* MA im Prozess und Prozessverbesserer
** IH, IT, Planung, Einkauf, QS, usw.

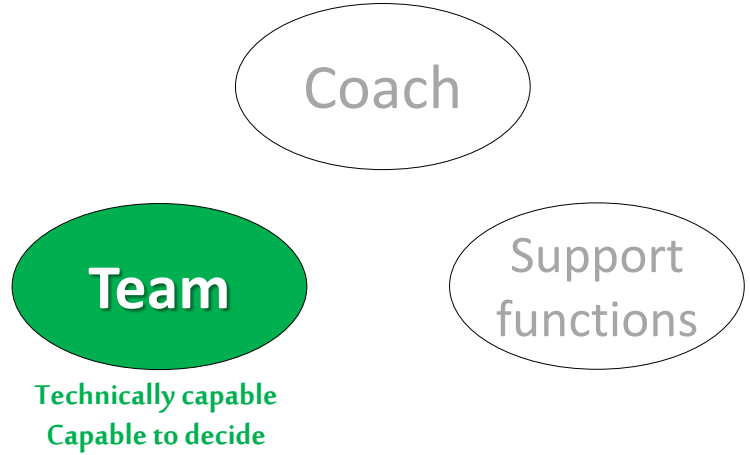
2- Partly Autonomous



3- Partly Autonomous



4- Maximum Autonomy and Problem solving competence

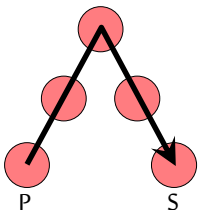


Coaches improve the Improvement Organisation by Eliminating Interfaces + increasing Autonomy of their teams

Which path should the information rightly take from problem discovery until the solution is implemented?



0%
Autonomous Teams

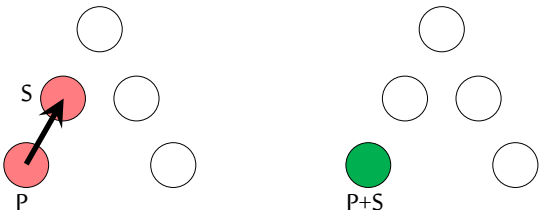


Not skilled to solve problems
Not allowed to decide

Long decision paths along many hierarchy levels of the „chain of command“, far away from problem’s point of cause

- Very slow -
- Very inefficient -

100%
Autonomous Teams



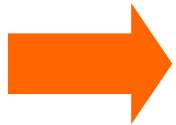
Skilled to solve problems
Allowed to decide

Immediate decision, Solution can be implemented directly at the problem’s point of cause

- Very adaptive -
- Very effective -

P: problem, S: solution

Workshop-Agenda

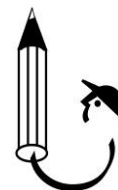


Chapter 1 Introducing Value Stream Mapping

Chapter 2 Drawing a Current State VS Map
– *practical exercise* –

Chapter 3 Features of an efficient,
customer-oriented Value Stream

Chapter 4 Drawing a Future State VS Map
– *practical exercise* –



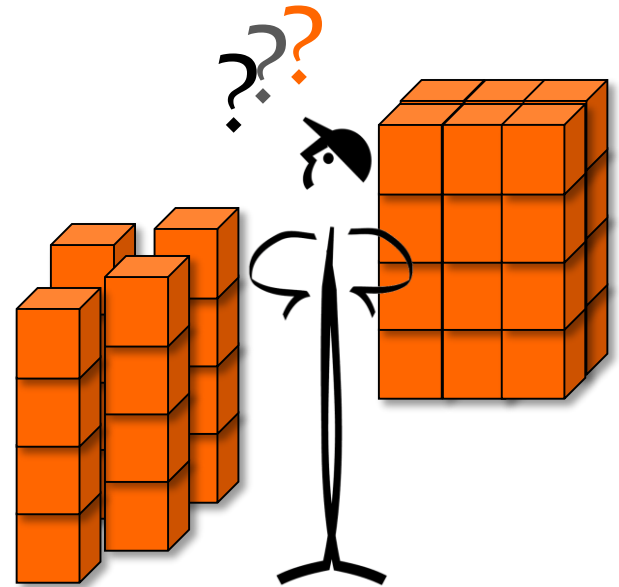
What have we learned after 30 years of continuous improvement ?

Take the value stream perspective !

Management needs to design an efficient, customer-oriented value stream and lead the implementation.

Can you see the **Flow**?

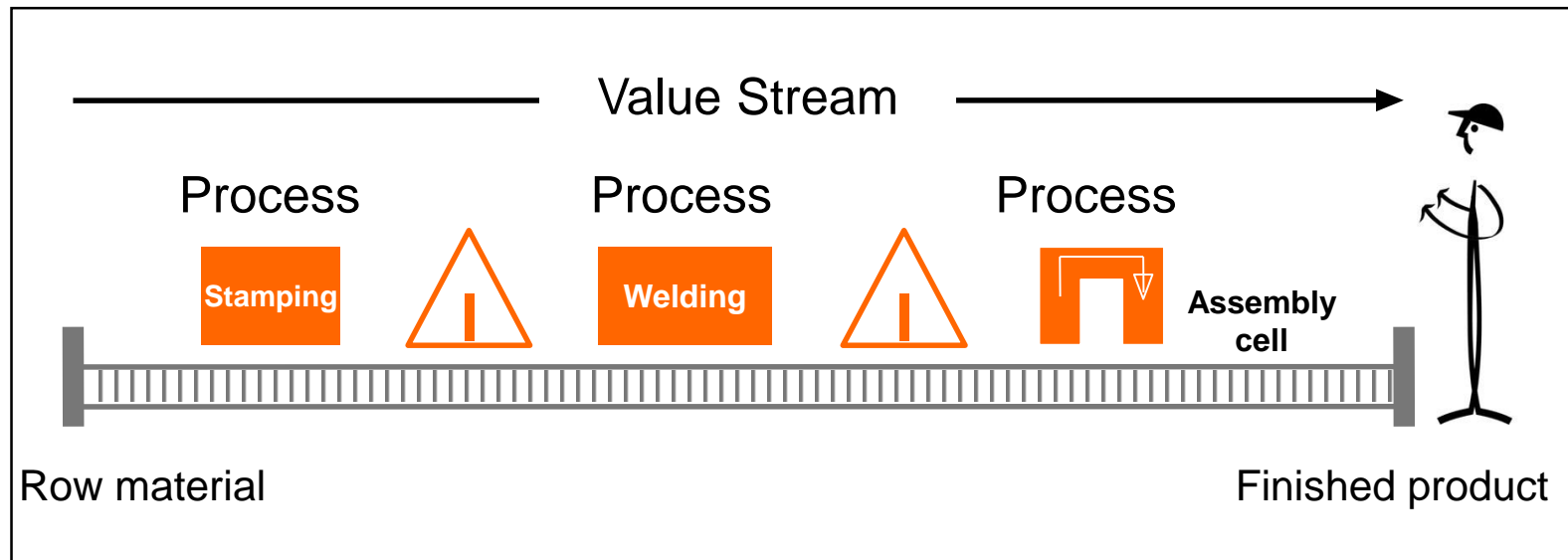
We need an effective way to understand and explain our value stream targets.



Process & Value Stream Improvement

“Process-Kaizen”
“Point-Kaizen”

“Flow-Kaizen”
“Systems-Kaizen”



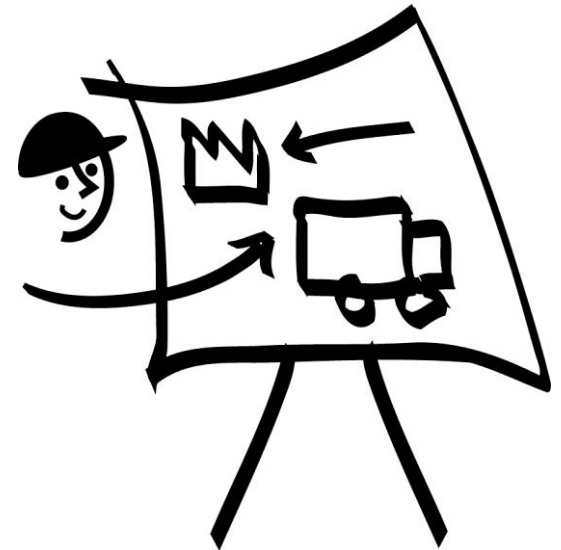
Value Stream =

The flow of all activities (value-added and non-value-added), from raw materials into the hands of the customers which are necessary to produce a product for which the customer is willing to pay.

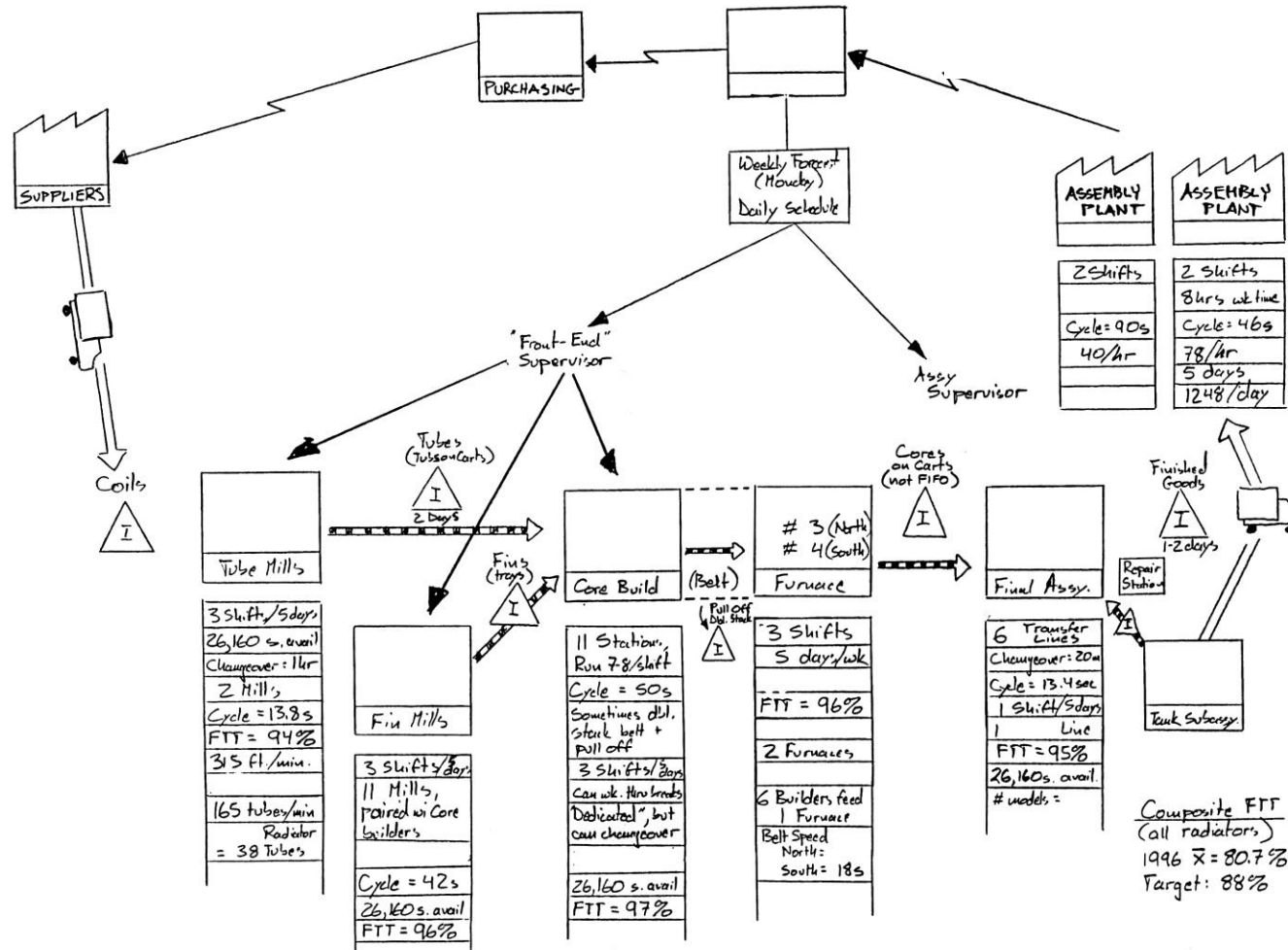
A helpful step: Value Stream Mapping

Trace the path of a product from beginning to end and draw a **visual representation** of all processes necessary to keep your **material and information flowing**.

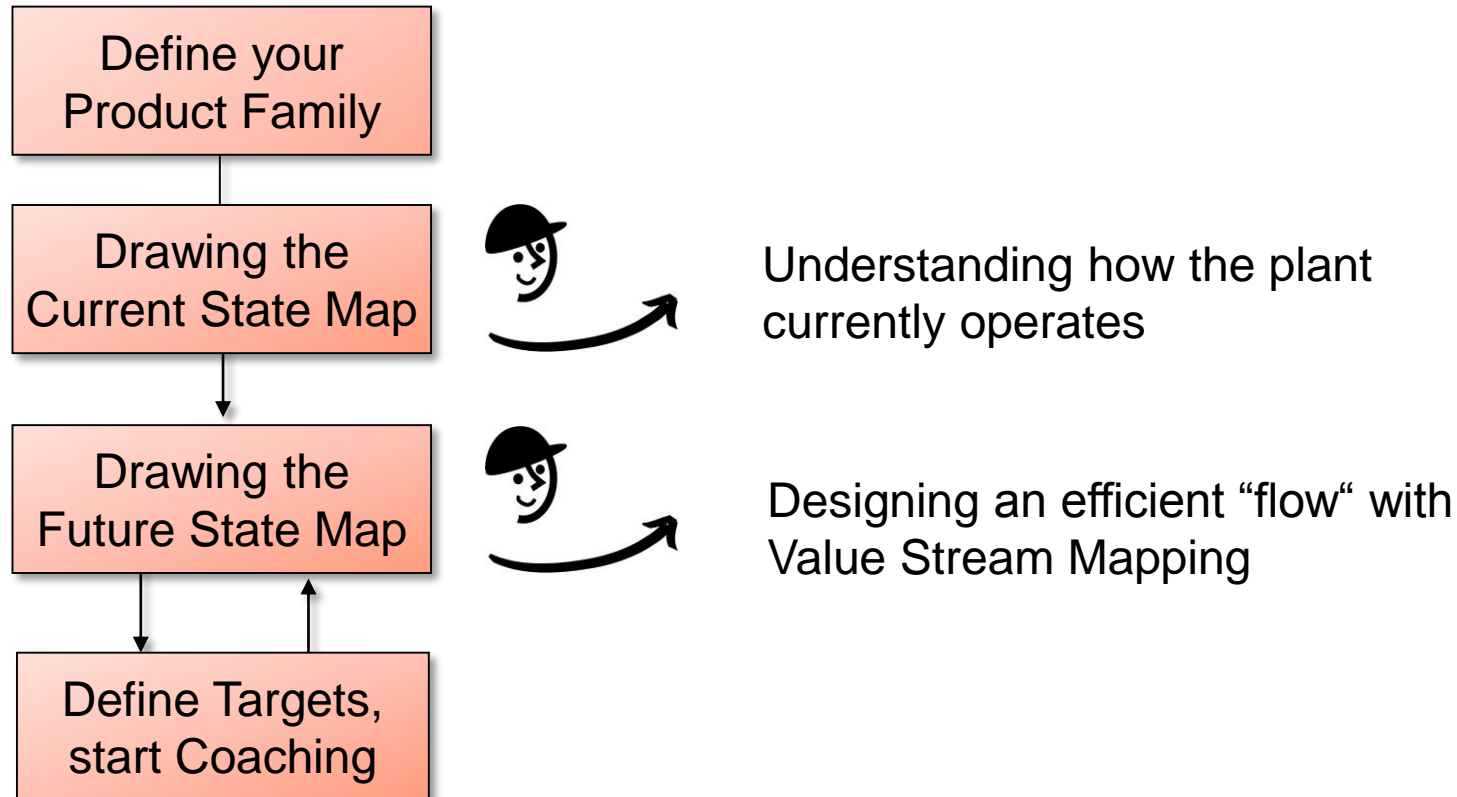
Then draw a „**Target Condition**“ showing how your Future Value Stream should look like in a time frame of **6-18 months**.



Acme Radiators – Current State



Use of value stream mapping method



Focus on a single Product Family at a time

Define your product family by finding
shared production processes and machines

		Assembly Steps & Equipment							
		1	2	3	4	5	6	7	8
PRODUCTS	A	X	X	X		X	X		
	B	X	X	X	X	X	X		
	C	X	X	X		X	X	X	
	D		X	X	X			X	X
	E		X	X	X			X	X
	F	X		X		X	X	X	
	G	X		X		X	X	X	

A Product Family

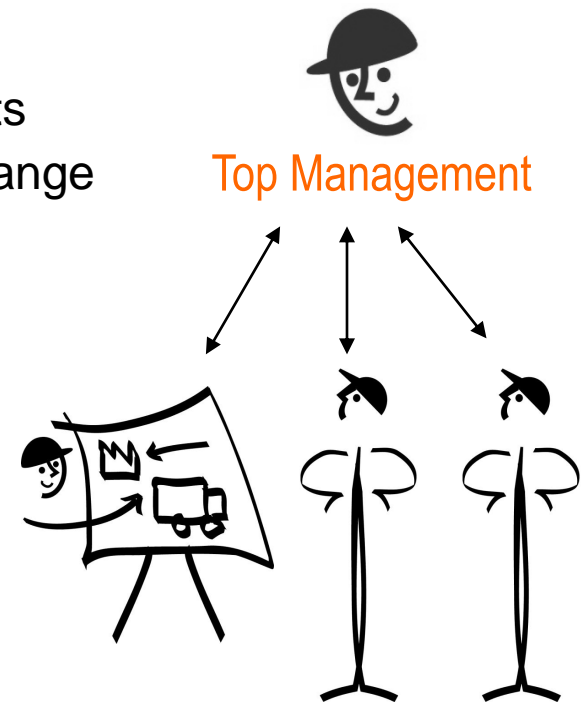
Value Stream Manager

Every value stream needs a Value Stream Manager!

-> someone who manages products across all functions

Give responsibility for Value Stream Mapping and its implementation to managers capable to support change across departmental boundaries.

The Value Stream Manager should report directly to the company's "Top Management".



Levels of Value Stream application

Begin here!



One plant („door to door“)

Process level

Many plants inside your organization

Many plants along whole supply chain

What is different?

- Change of perspective
- Focus on Lead Time reduction
- Focus on the interfaces between processes
- Material- und Information flow
- Simple representation on a single sheet of paper
- Continuous refinement of the vision by iterative learning



Workshop-Agenda

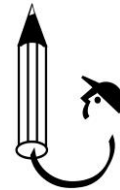


Chapter 1 Introducing Value Stream Mapping

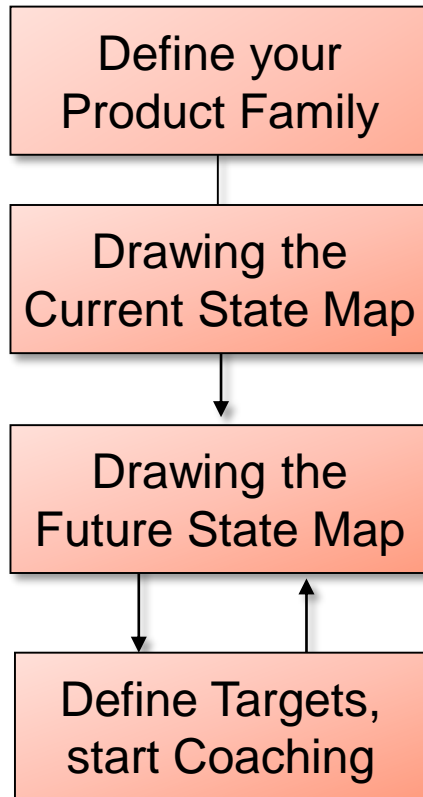
Chapter 2 Drawing a Current State VS Map
– *practical exercise* –

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– *practical exercise* –



Drawing the Current State Map

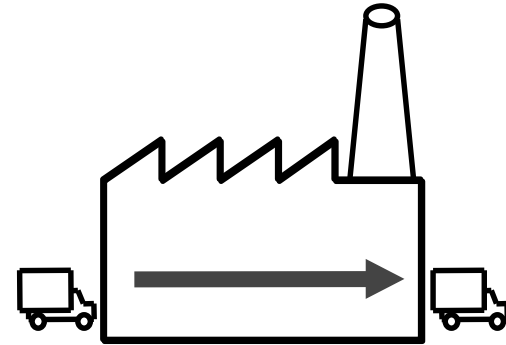


Understanding how the plant currently operates:

- Material and Information flows
- Draw using standardized symbols
- Start at the “door to door” level
- Walk yourself along the value stream and draw your map by hand, using just a pencil
- **No standard times!**
- The current state is the basis for the next steps
- With new products, try to find and analyse similar value streams

Case example: Stamping Inc.

Stamping Inc. produces various components for the car industry.



This case relates to a product family of steel dashboard supports made in two versions (a left-hand drive and right-hand version).

These components are delivered to a car assembly plant in Cologne, Germany.

Case example: Stamping Inc. - continuation -

Customer demand:

- 18.400 pieces per month
 - 12.000 per month „left“
 - 6.400 per month „right“
- Shipping container with 20 supports.
The customer orders per container (several containers per order).
- The assembly plant receives a truck delivery every day

Working hours:

- 20 days per month
- Two shifts per day in all manufacturing departments
- 8 hours per shift, overtime is possible if required
- Two 10-minute breaks per shift.
During breaks, manual processes stop running.
- Unpaid lunch break.

Case example: Stamping Inc. - continuation -

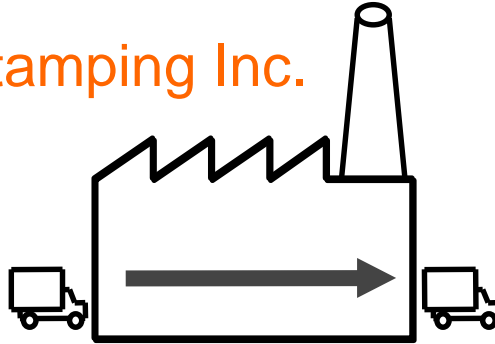
Production processes :

The process steps of this product family at Stamping Inc. include punching metal parts, spot welding them and subsequent assembly. After finishing, the components are brought to the shipping dock where they get sent daily to the car assembly plant.

The changeover time for the stamping press takes 1 hour and another 10 minutes at the spot welding process, necessary to change fixtures.

The Ruhr AG supplies Stamping Inc. every Tuesday and Thursday with steel coils .

Case example: Stamping Inc.



1) **STAMPING** (Shared process for many value streams)

- Cycle Time C/T: 1 sec. (60 pcs/min.)
- Change over C/O: 1 hour
- Automated 200-Ton Press with coil feed
- Uptime: 85 %
- Current buffer stock:
 - 4.600 stamped parts „left“
 - 2.400 stamped parts „right“
 - 5 days row steel or coils

2) **SPOT-WELDING-STATION I**

- Manual process with one operator
- Cycle Time C/T: 39 sec.
- Change over C/O : 10 min (Change of fixture)
- Uptime: 100 %
- Current buffer stock:
 - 1.100 pieces „left“
 - 600 pieces „right“

3) **SPOT-WELDING-STATION II**

- Manual process with one operator
- Cycle Time C/T: 46 sec.
- Change over C/O: 10 min (Change of fixture)
- Uptime: 80%
- Current buffer stock :
 - 1.600 pieces „left“
 - 850 pieces „right“

4) **ASSEMBLY-STATION I**

- Manual process with one operator
- Cycle Time C/T: 62 Sek.
- Change over C/O : none
- Uptime : 100%
- Current buffer stock :
 - 1.200 pieces „left“
 - 640 pieces „right“

5) **ASSEMBLY-STATION II**

- Manual process with one operator
- Cycle Time C/T: 40 Sek.
- Change over C/O : none
- Uptime : 100%
- Current buffer stock :
 - 2.700 pieces „left“
 - 1.440 pieces „right“

6) **SHIPPING DEPARTMENT**

- Disposition of the finished goods from warehouse
- Packaging for shipment by truck

Case example: Stamping Inc. - continuation -

Production Planning at Stamping Inc.:

- Receives customers 90/60/30-day forecast and enters it in the PPC system.
- Sends a 6-week-forecast via PPC system to the Ruhr AG.
- Secures steel coil deliveries by a weekly fax order to the Ruhr AG.
- Receives daily a binding order from the Cologne plant.
- The PPC system calculates a weekly production plan for all departments, based on sales orders, WIP, finished goods inventory and expected production losses (scrap, rework, downtimes).
- Sends the weekly production plan to the stamping, welding and assembly departments.
- Sends a daily shipping list to the shipping department.

Typical steps for drawing the Current State Map

- Determine Customer information and demand
- Quick walk along the value stream to identify the sequence of main processes
- Fill out data boxes, draw inventory triangles, note inventories
- Draw supplier processes
- How does each process know what to produce next? (draw Information flow)

Typical steps for drawing the Current State Map

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- Where is the material being pulled or pushed to the next process?

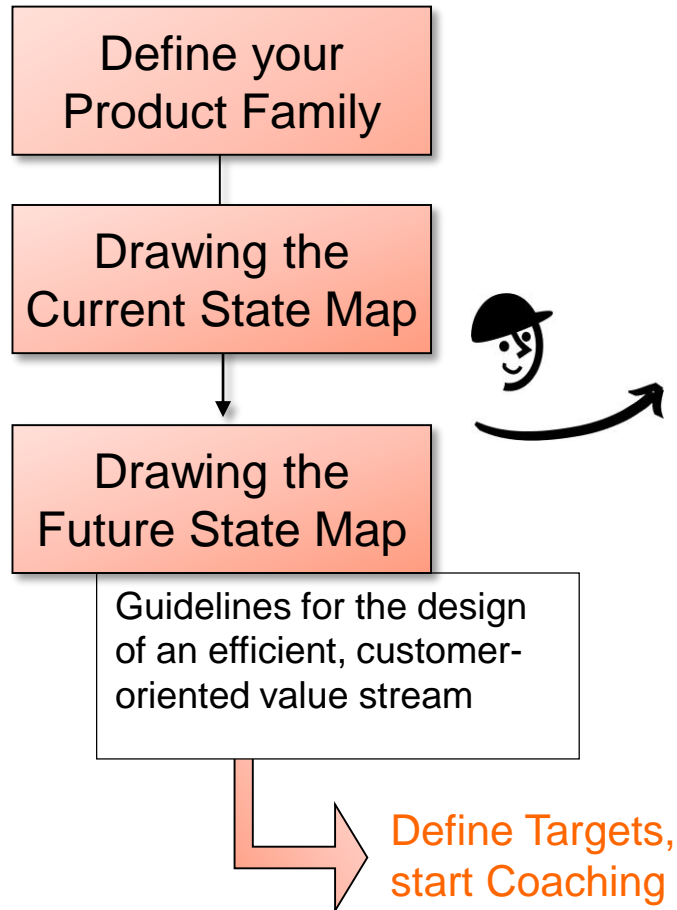
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- Draw supplier processes
- How does each process know what to produce next? (draw Information flow)
- Where is the material being pulled or pushed to the next process?
- Calculate the total Lead Time of our Value Stream

Some questions to understand the Current State of your Processes

- What is the Cycle Time c/t of your process?
- What is the Change Over c/o time for this machine or process?
- How reliable is this process/ What is the current downtime of this machine?
- What is the Lot Size/ Container Size for finished parts at this process?
- How large are the Buffers between and inside every single process?
- How many operators are running this process?
- How many different types/variants do you have at this process?
- Working time/shifts per day?
- Rework/Scrap rate?
- Lead Time and Total Process Time?

Drawing the Future State Map

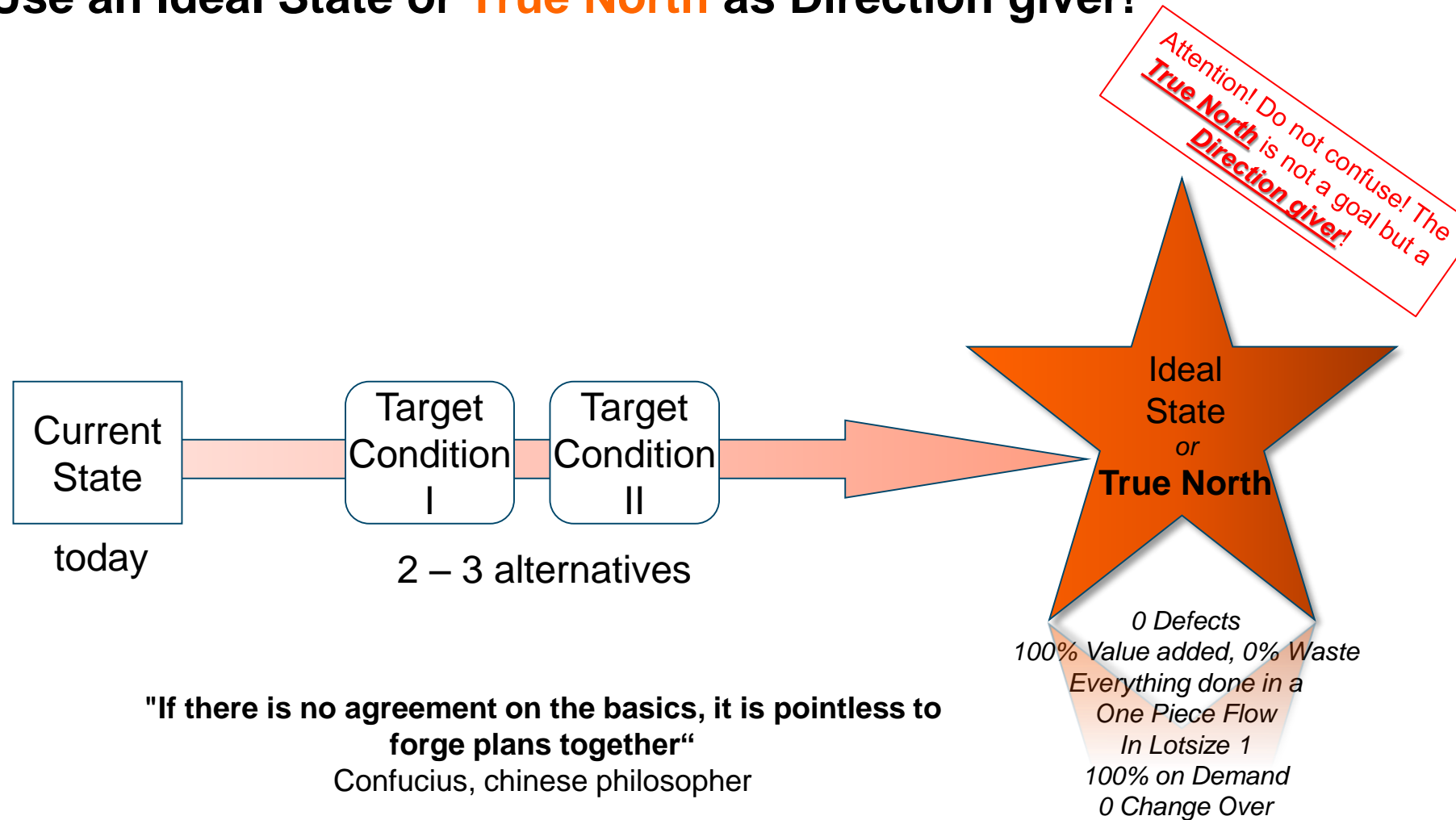


The Design of an Efficient Flow:

... this is the strength of Value Stream Design

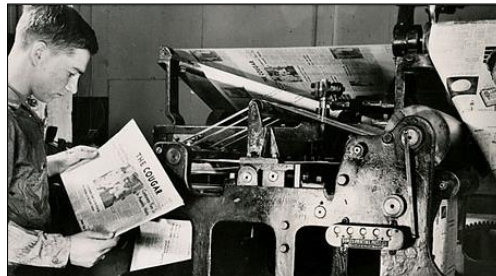
- A Target State Map is your working basis
- 70 % accuracy for the Current State is enough, since you will continuously refine your map as you keep learning (use a pencil!)
- Material- and Information Flow
- Start at the Current State Map
- The first iterations should start with existing machines and processes: we should relocate, combine or remove equipment, making only smaller purchases.

Use an Ideal State or **True North** as Direction giver!



Developments towards **True North** can be seen over the **Centuries!**

Printing



True North

Music



Photography

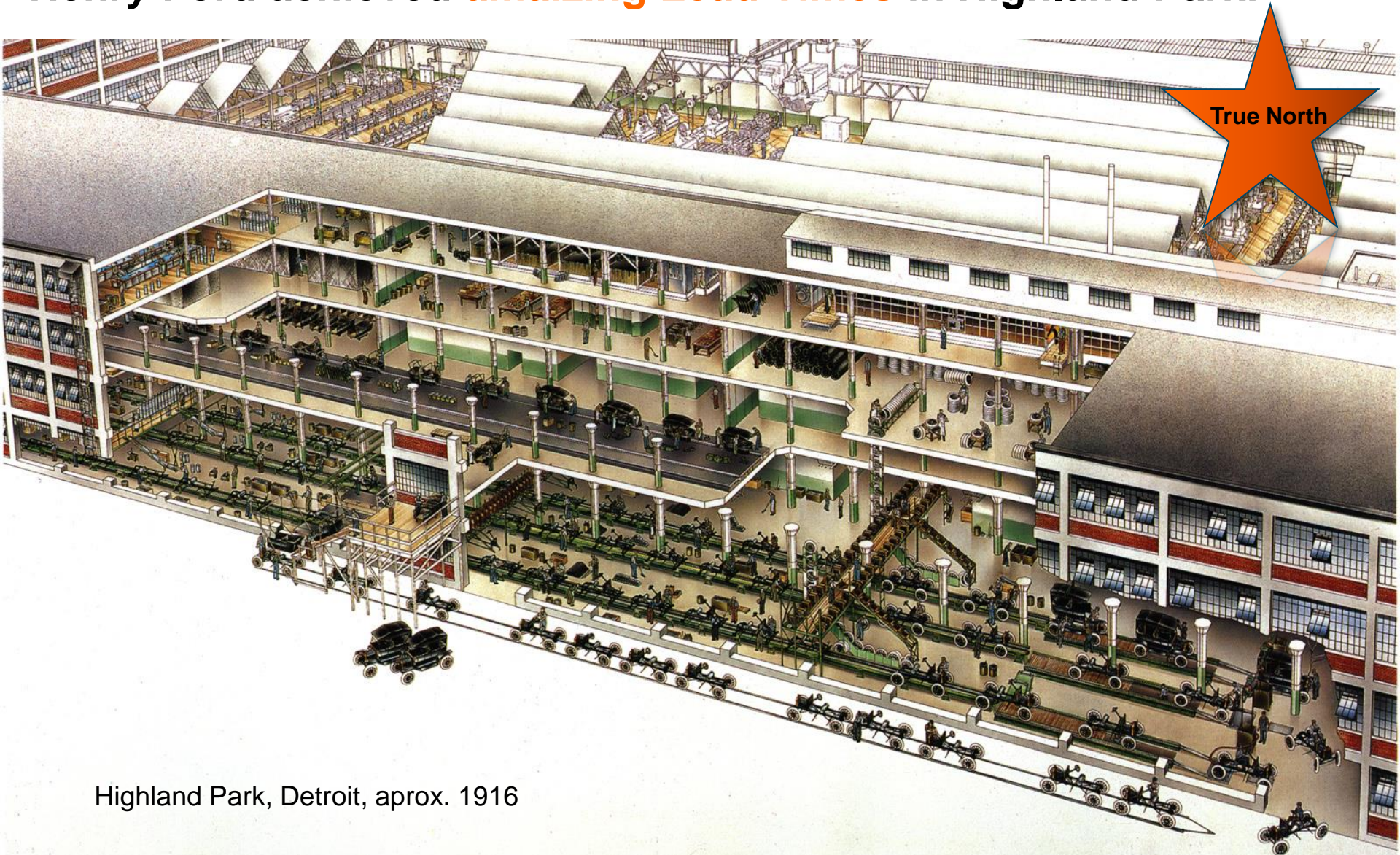


*Large Lots, long Change Overs,
expensive, long Lead and Waiting Times*



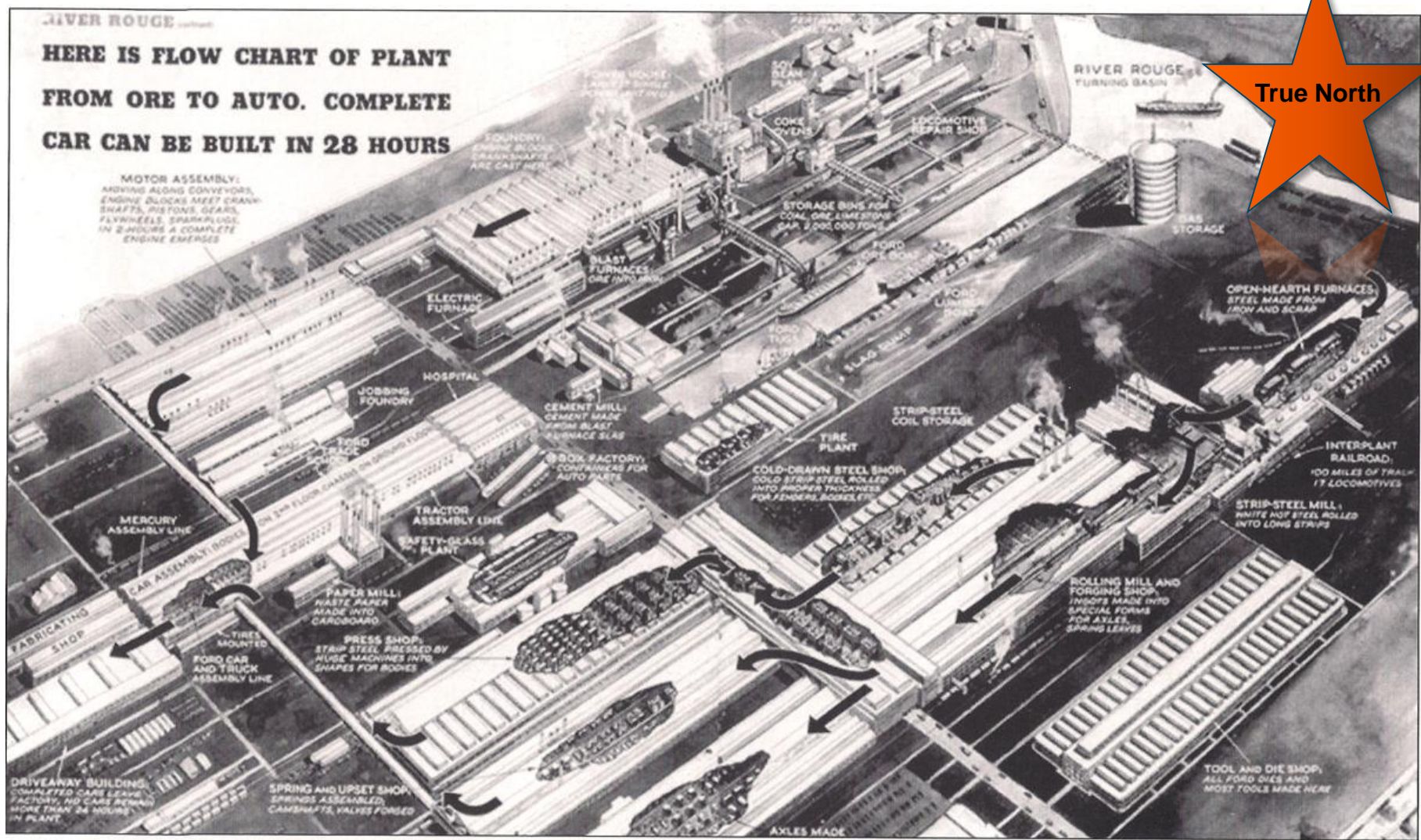
*Lotsize 1, no C70, cheap, shortest
Lead Time, often no waiting at all!*

Henry Ford achieved **amaizing Lead Times** in Highland Park!



Highland Park, Detroit, aprox. 1916

Henry Ford achieved even better **Lead Times** in River Rouge!



Workshop-Agenda

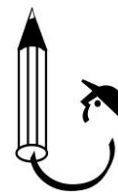
Chapter 1 Introducing Value Stream Mapping

Chapter 2 Drawing a Current State VS Map
– *practical exercise* –

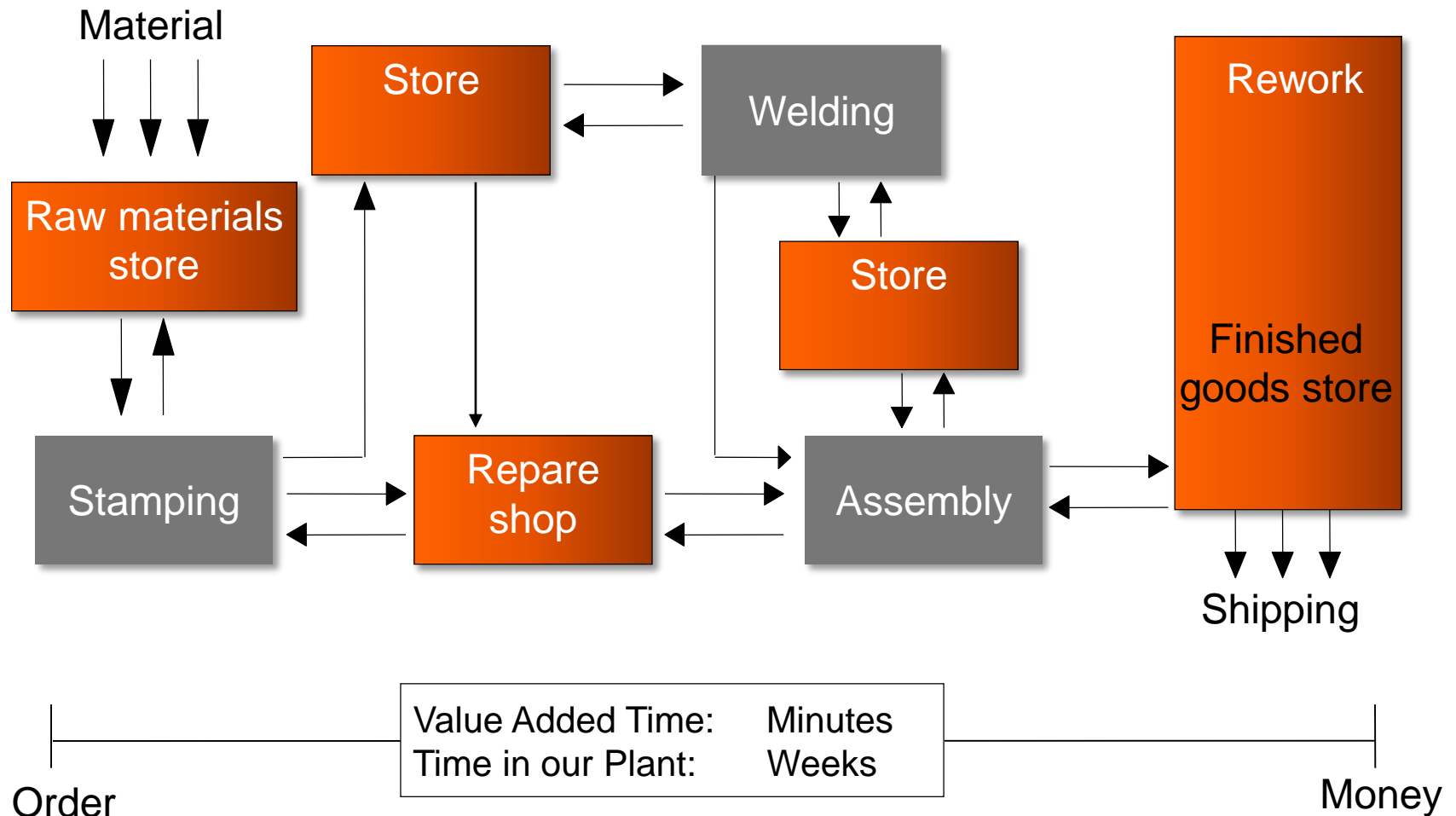


Chapter 3 Features of an efficient,
customer-oriented Value Stream

Chapter 4 Drawing a Future State VS Map
– *practical exercise* –



Mass production: huge Lots, material push, „Silo-thinking“



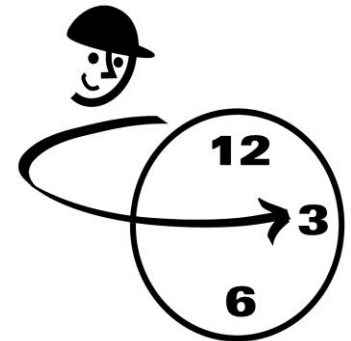
Waste



Waste are activities that do not add value for the customer.



Waste costs you Time and Money.

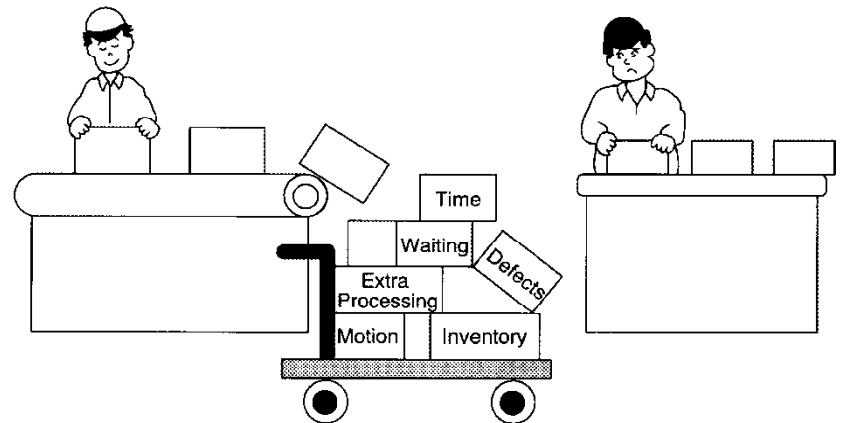


Important points to make about „Waste“:

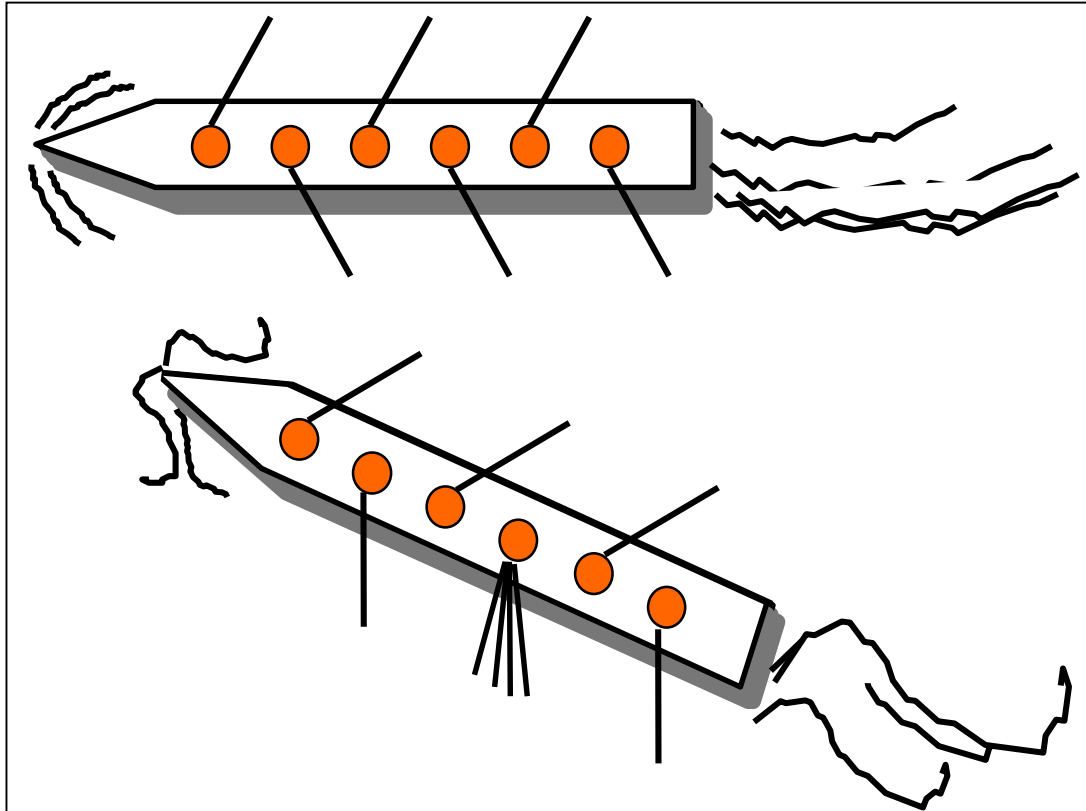
- Waste implies there are Problems hidden in your Value Stream.
- Waste is rather a Symptom than the Root Cause of a Problem.
 - ➡ We must find and eliminate the Root Causes of our Problems and Wastes.

„Overproduktion“

- = **More**
production, as needed for the next process
- = **Earlier**
production, than needed for the next process
- = **Faster**
production, than needed for the next process



Individual Performance versus Systems Performance



Question:
How fast should
we all produce?



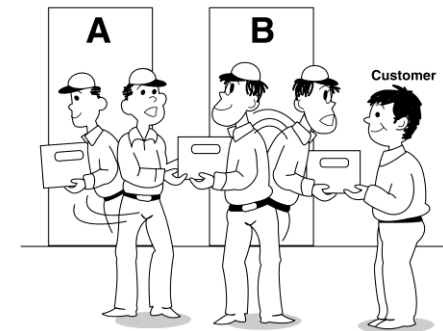
1. Customer Takt

The Customer Takt is a Production Rate which is based on our Sales Rate.

The Customer Takt helps in synchronizing the Assembly Rhythm with the Sales Rhythm .

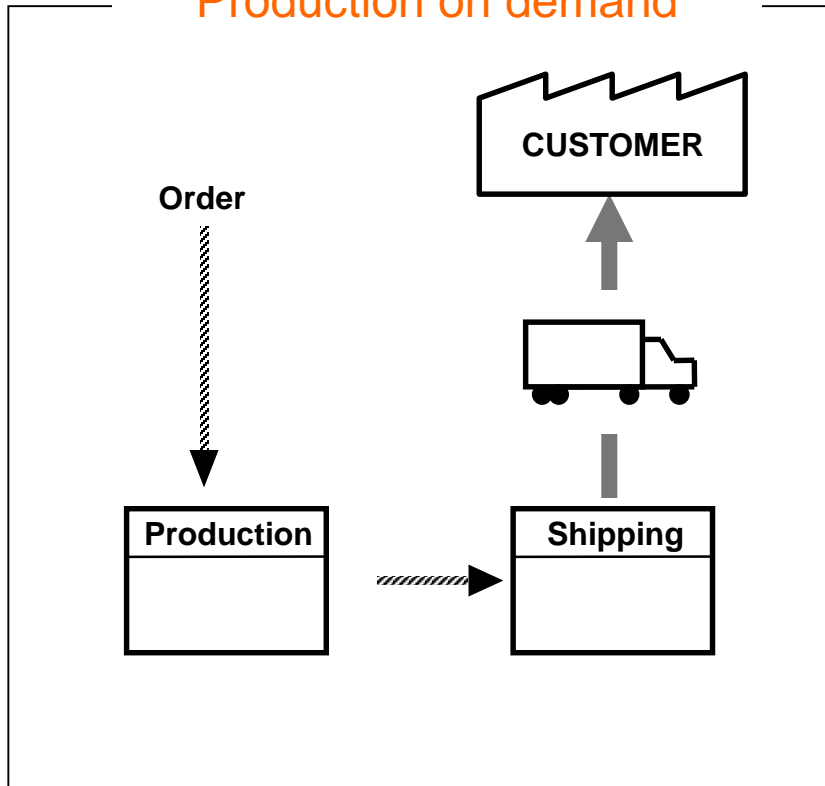
$$\text{Customer Takt} = \frac{\text{Available uptime per shift}}{\text{Customer demand per shift}}$$

$$\text{Customer Takt} = \frac{27.600 \text{ sec.}}{460 \text{ pcs.}} = 60 \text{ sec.}$$

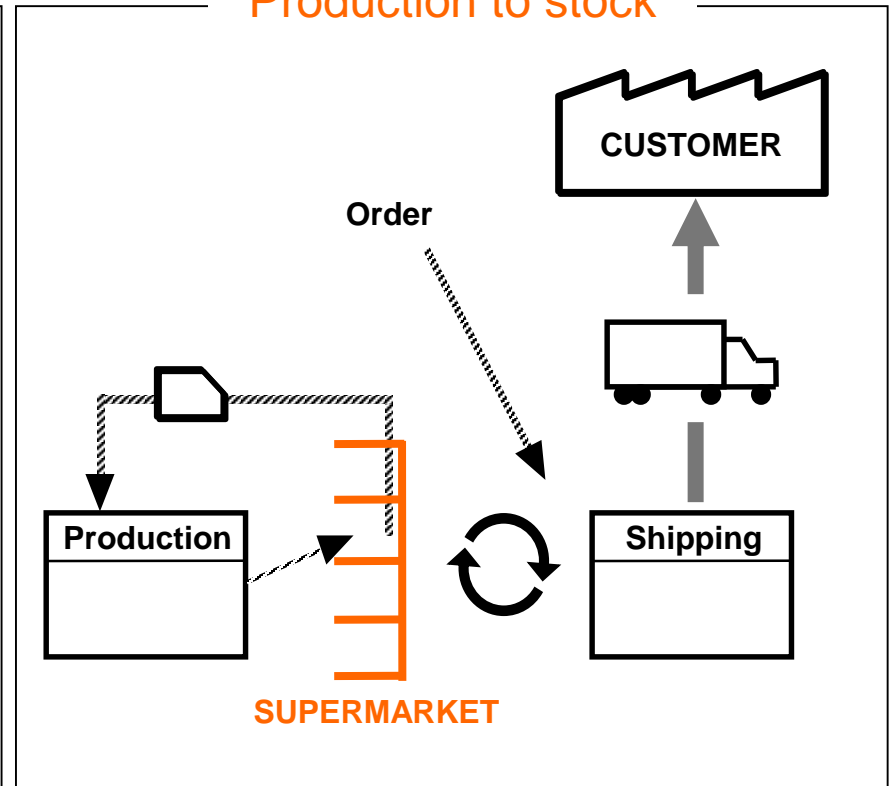


2. Producing according to customer demand or to stock?

Production on demand

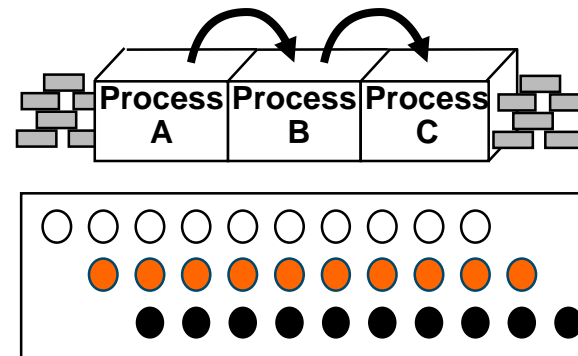
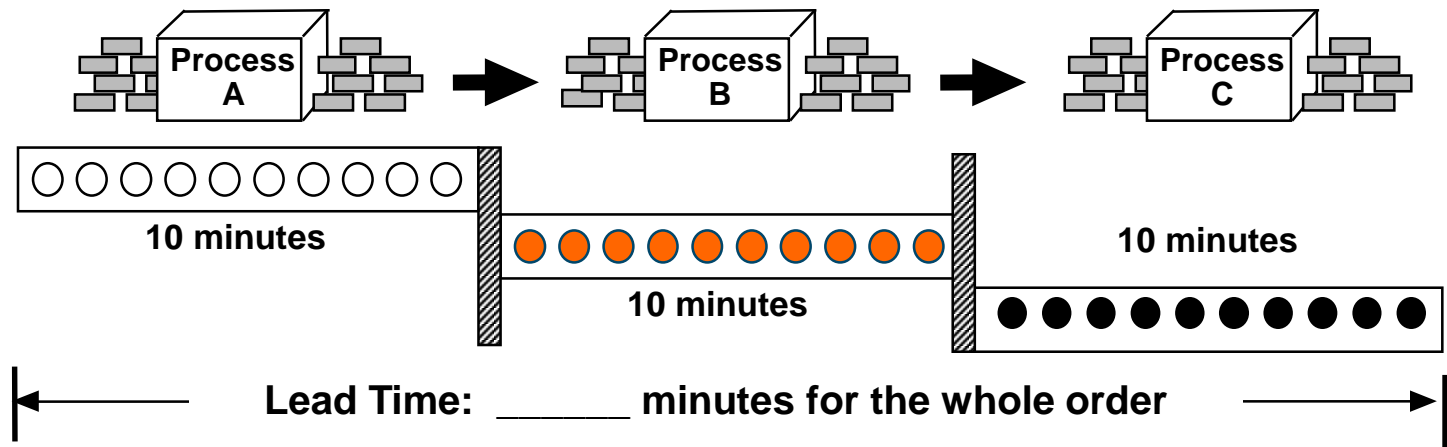


Production to stock



3. Continuous flow or One Piece Flow

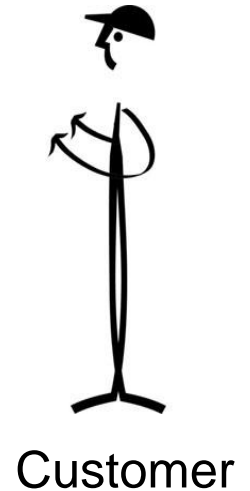
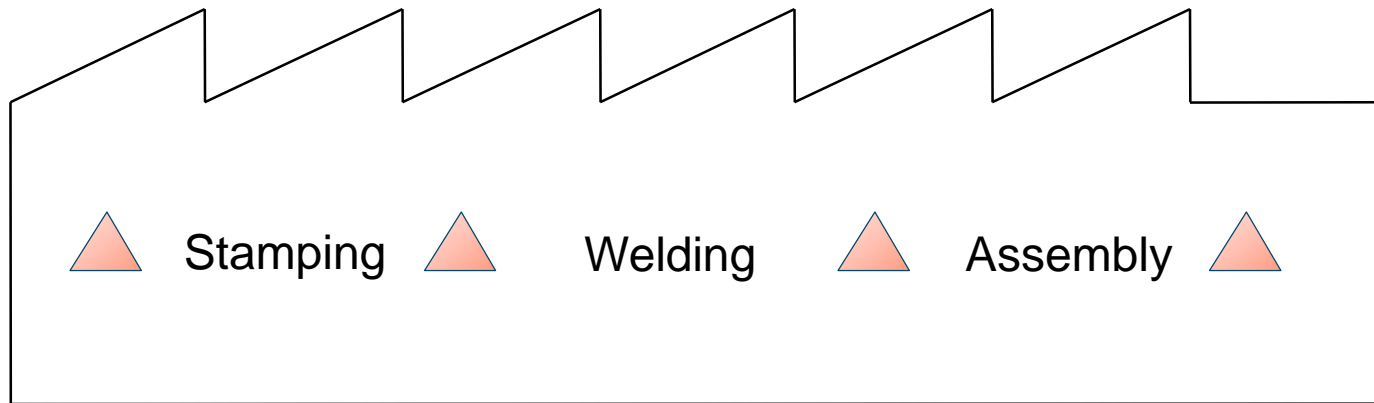
a) Batch and Queue Production



b) Continuous 1x1-Flow

Problematic Places in your Flow

Where does the One-Piece-Flow end?



Customer



How can we control production between flow segments?
Should we use a PPC-based production planning system?

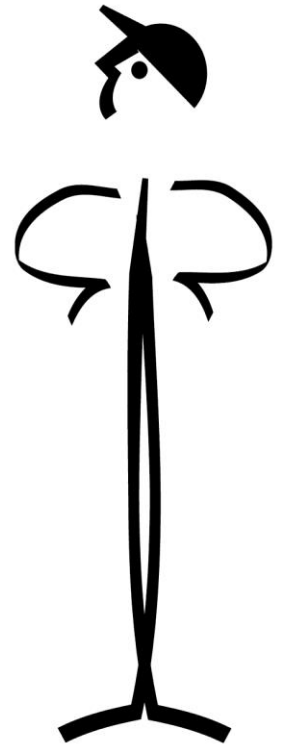
Planning your Production?



Production schedules change constantly

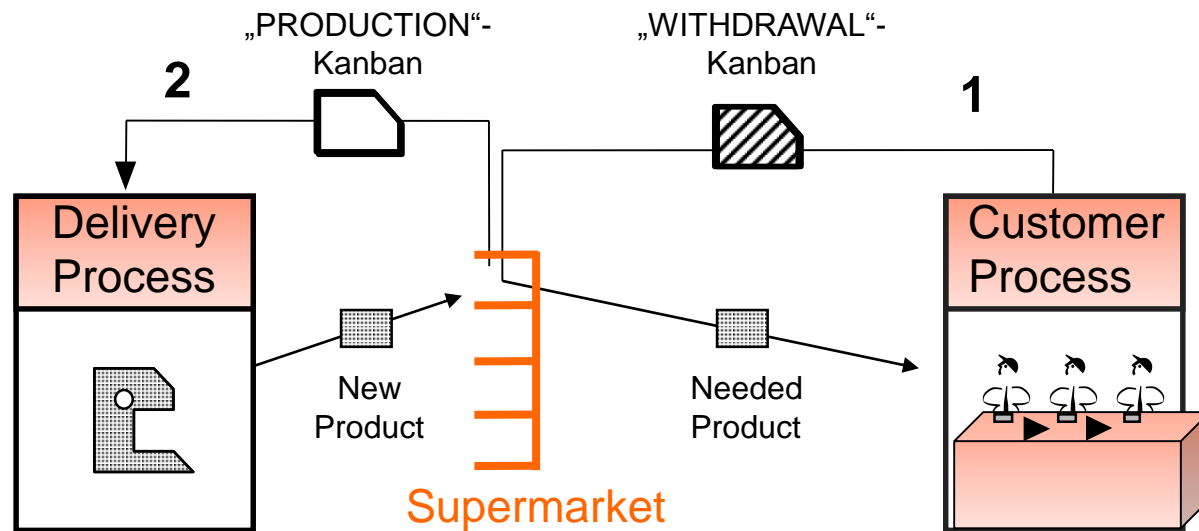


Production never goes according to plan



4. Supermarkt-Pull-Systems

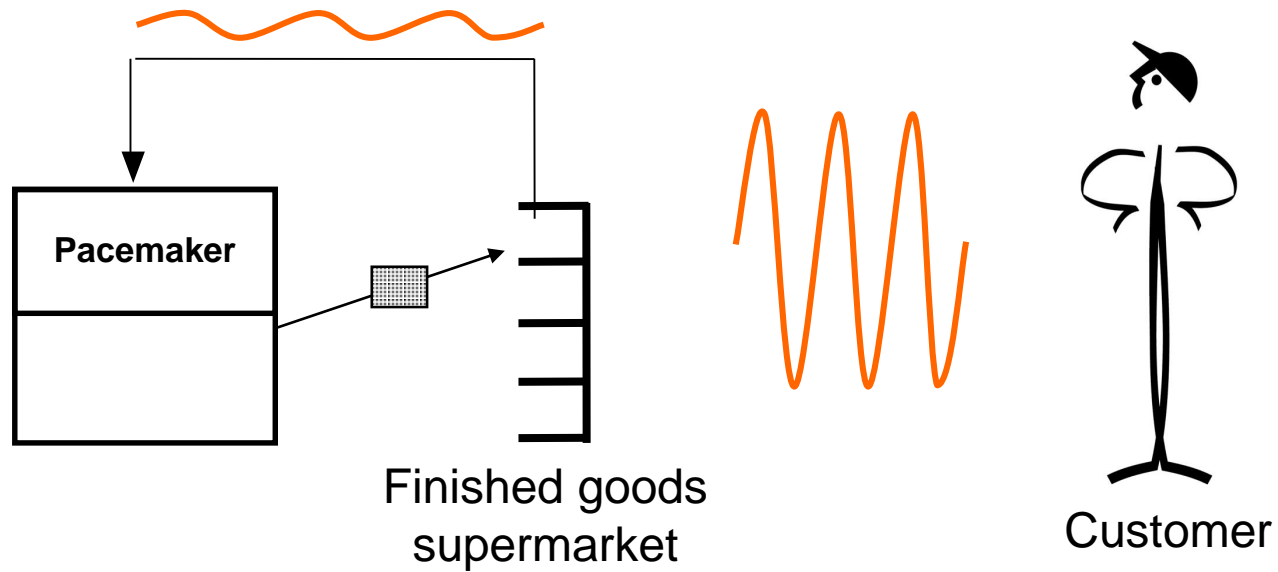
Customer process goes to the supermarket and picks what is currently needed.
The delivery process only produces to refill the collected products.



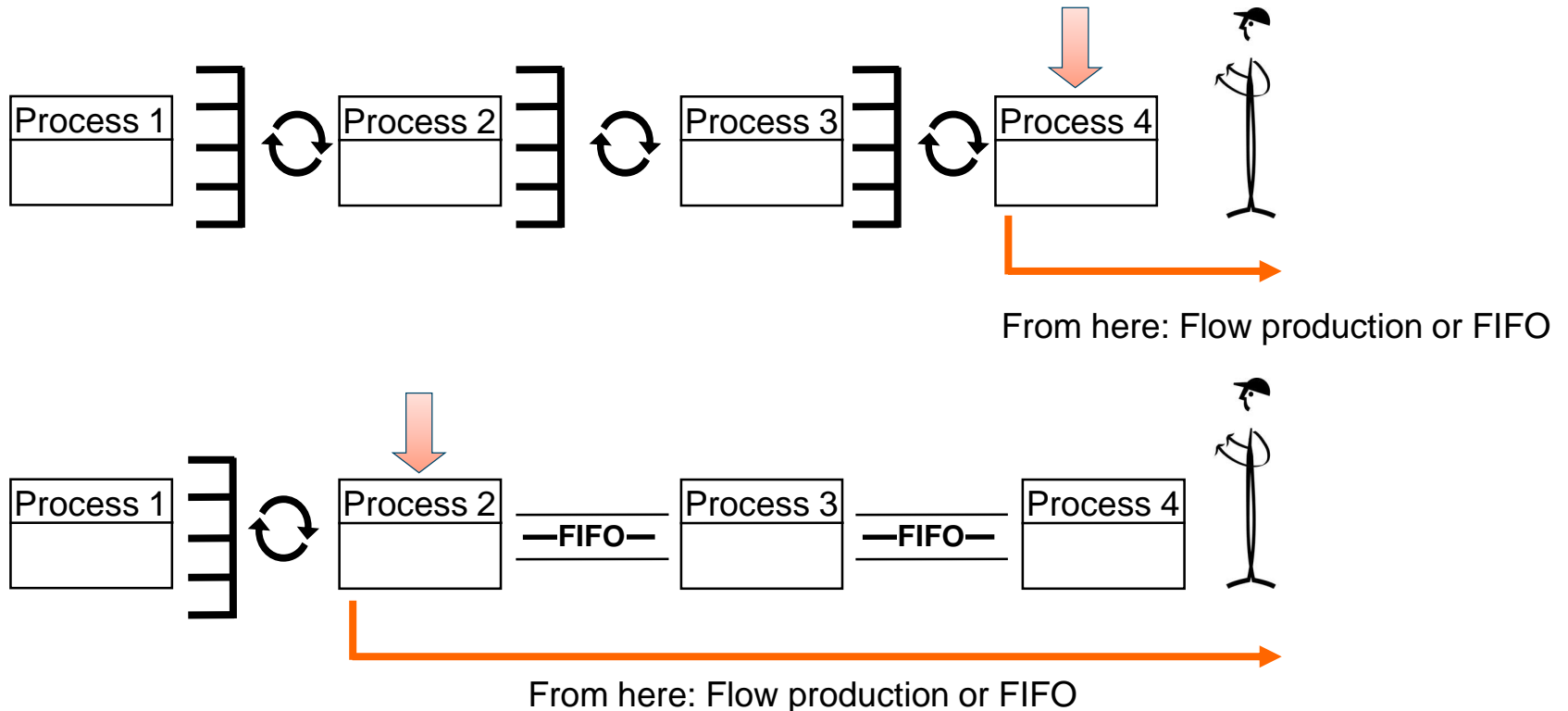
Purpose:

- One way to regulate the flow between production processes
- Builds a chain among processes, connected to through customer-supplier relationships
- Makes Problems visible
- Allows continuous, step by step elimination of the supermarket

Compensating daily fluctuations



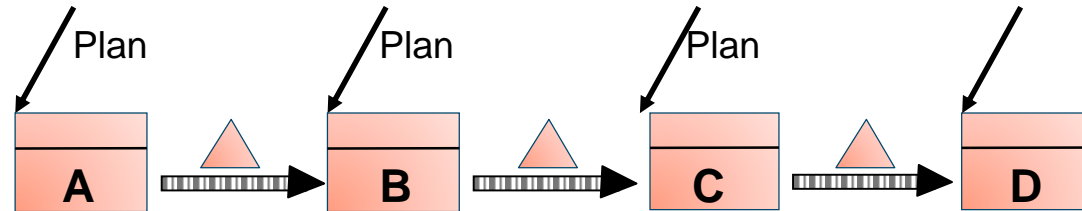
5. Try to schedule only one point (pacemaker) of the value stream!



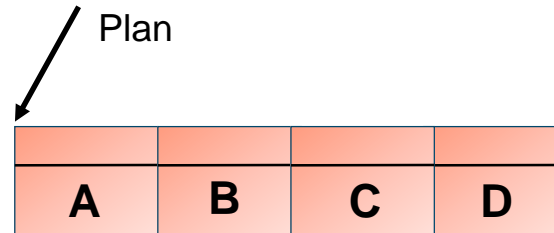
Use Flow production whenever possible, otherwise use Supermarket-Pull or FIFO

Alternatives to Push

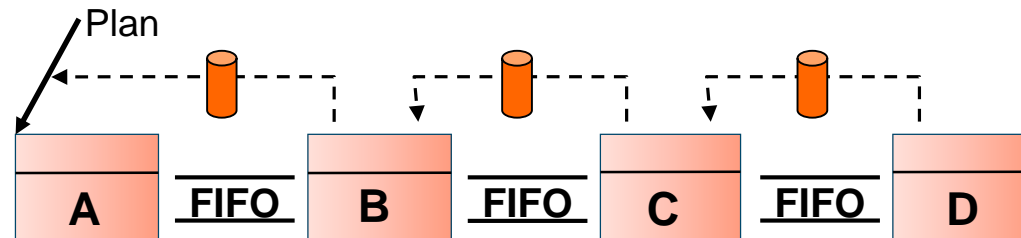
Push



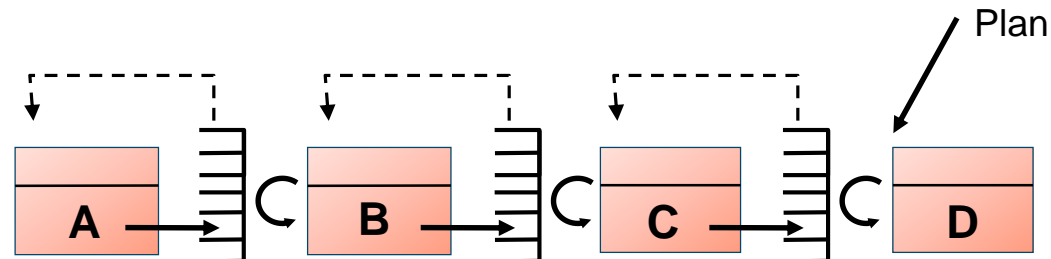
One Piece Flow 1.)



FIFO 2.)
(with a defined max. Buffer)



Supermarket Pull 3.)



6. Small Lot Production and fixed Change Over Sequences

Bad:

Production Plan	
Monday.....	400 A
Thursday....	100 A, 300 B
Wednesday..	200 B, 200 C
Thursday....	400 C
Friday.....	200 C, 200 A

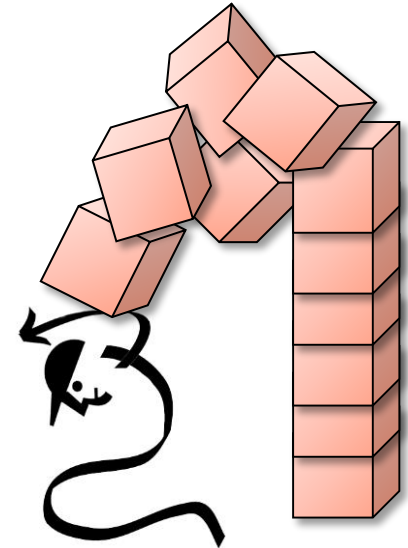
(Ergebnis)

Better:

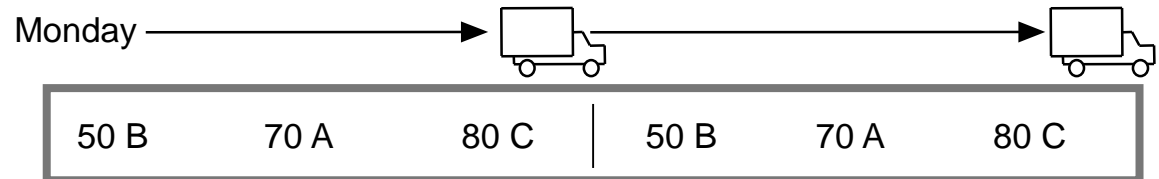
Monday:

140 A 100 B 160 C

jedes Teil jeden Tag



even better:

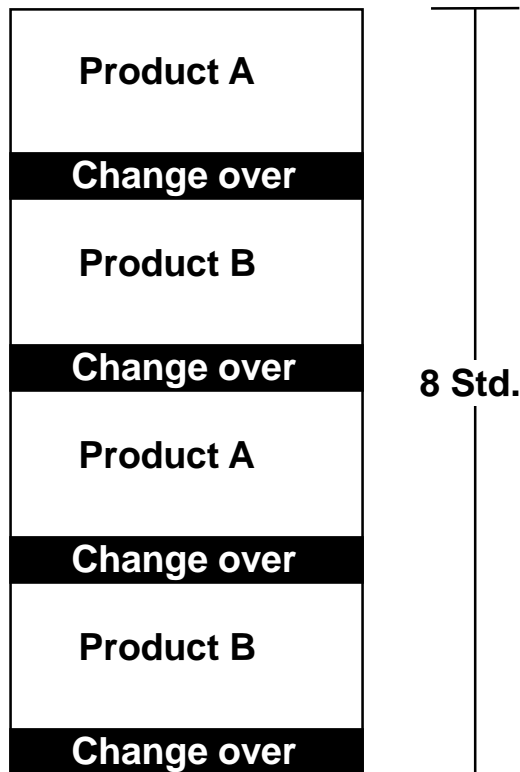


Every Part to Every Delivery Slot ("Window")

IMPORTANT: Short Change Over and frequent C/O at the delivery process!

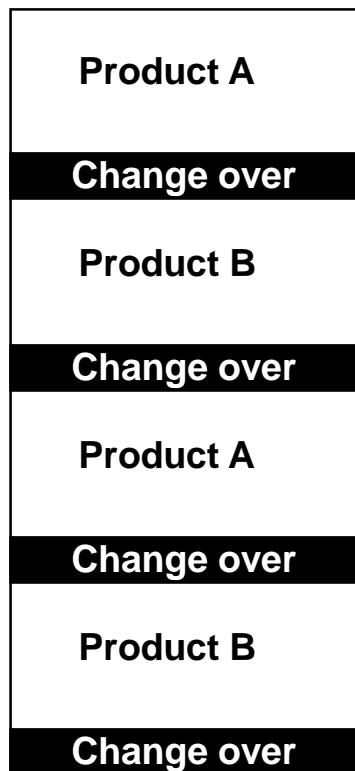
Halving the C/O times leads to halving the Lot Sizes, leading to halving the necessary buffers and Lead Time

Before:



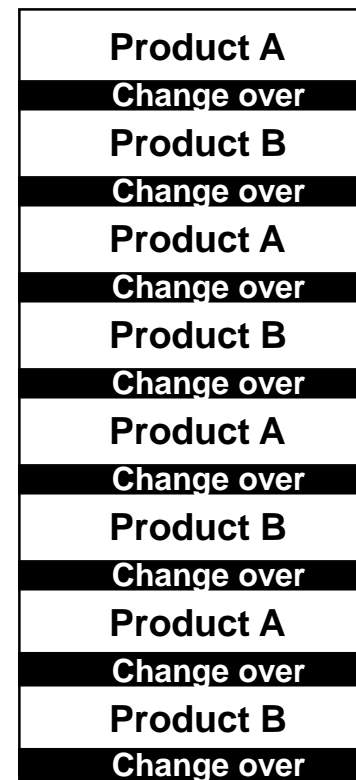
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Before:

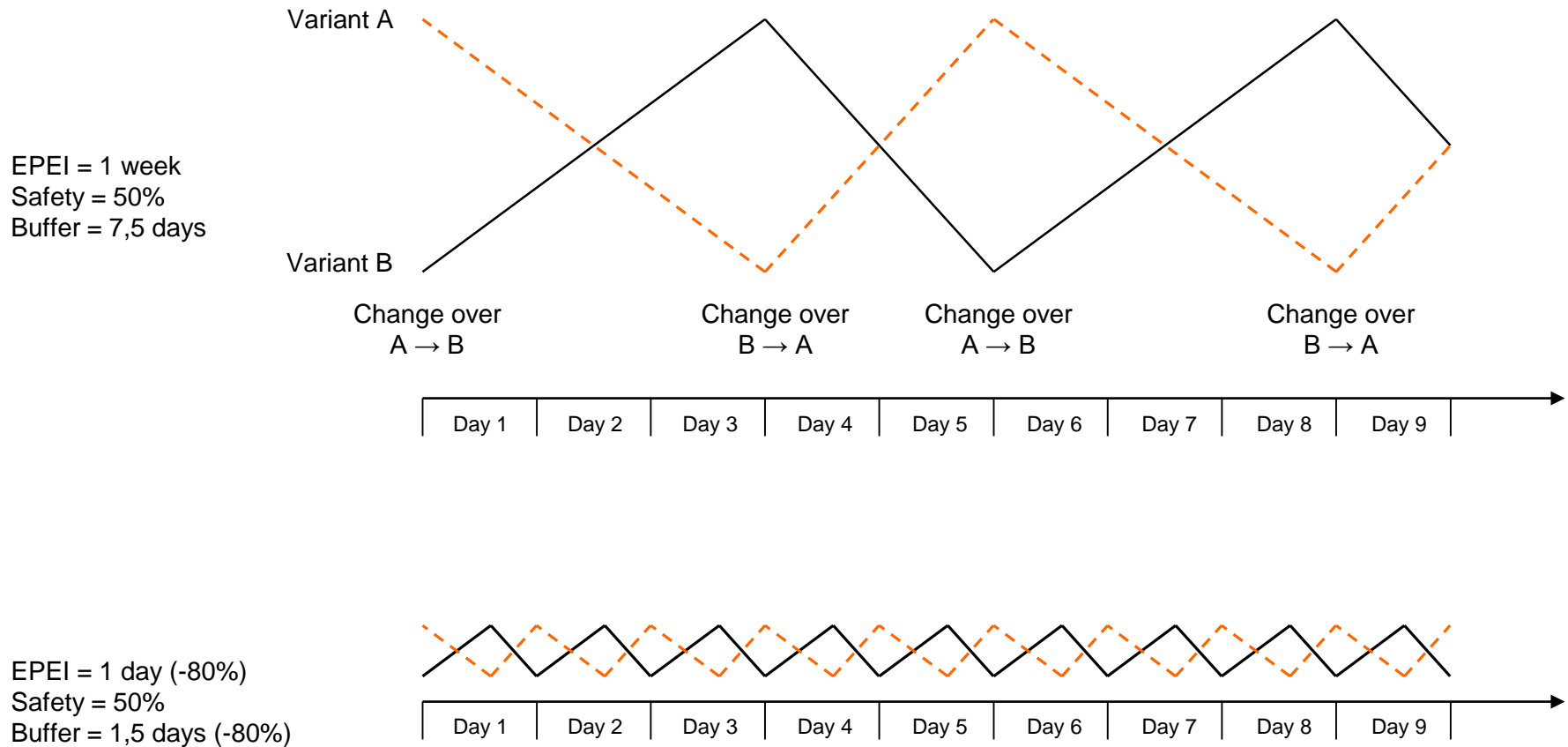


8 Std.

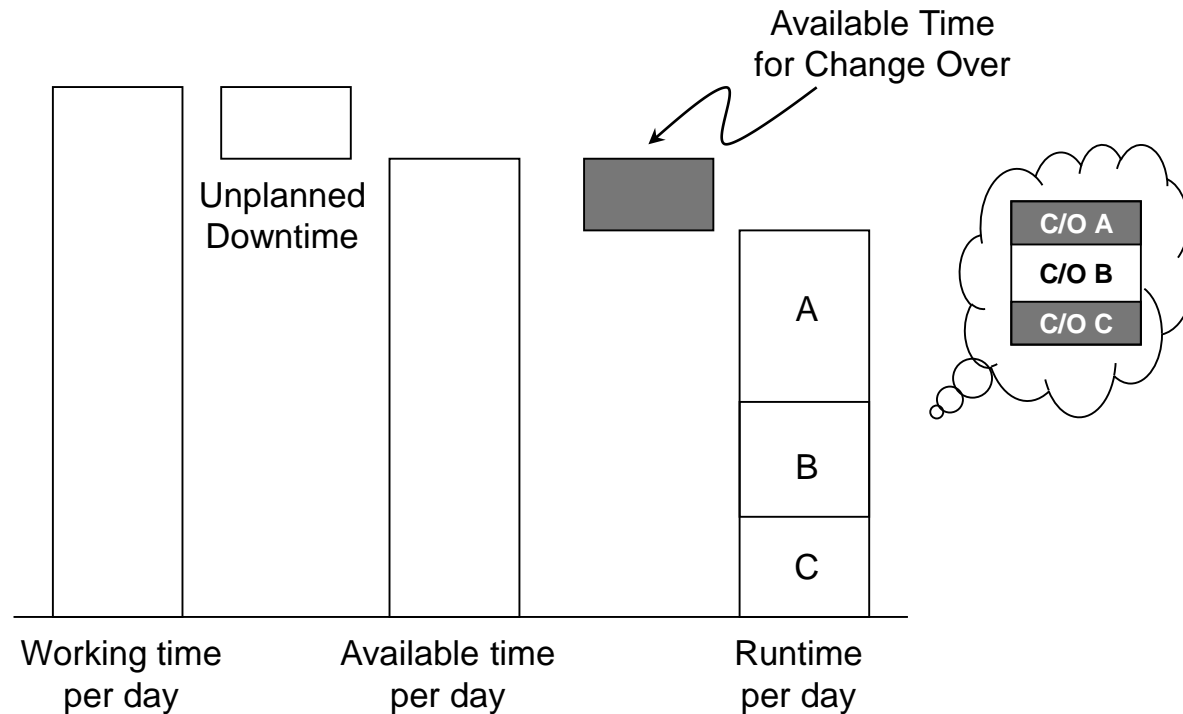
C/O time reduced:



How does EPEI influence your Buffer and Lead Time?

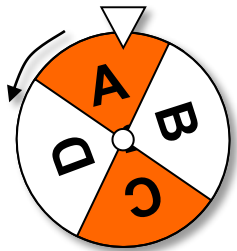


How do you calculate your EPEI?



$$\text{EPEI} = \frac{\sum_i (\text{Change over}_i)}{\text{Available time per day} \times \text{Uptime} - \sum_i (\text{Customer demand per day}_i \times \text{Cycle Time}_i)}$$

How do you calculate your EPEI?



Rüstscheibe

What is the current EPEI of the stamping press at Stamping Inc.?

Available working time = 2 sh. x 8 hs. x 60 min - 2 x 20 min = 920 min

Uptime = 85%

i = 4 Types

Customer demand: Type A = 600 pcs/day, CT = 1 sec, C/O = 60 min

Type B = 320 pcs/day, CT = 1 sec, C/O = 60 min

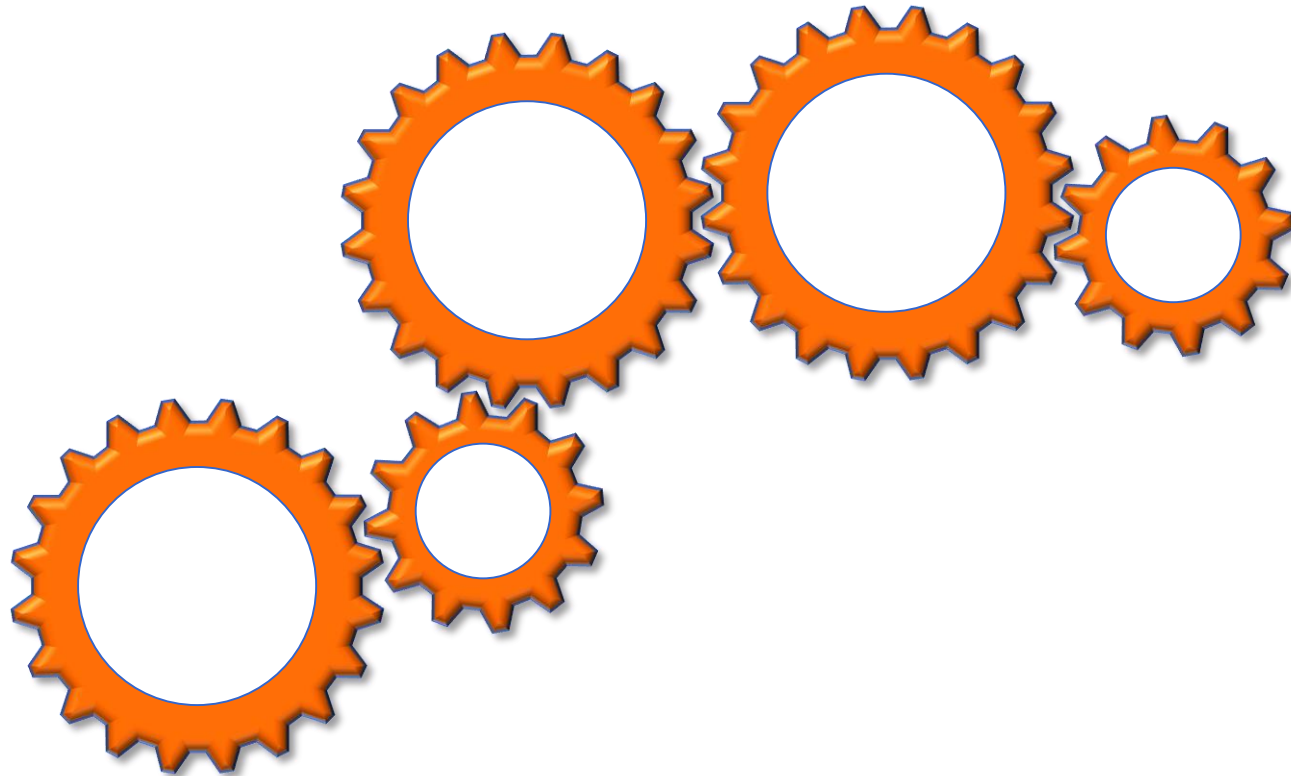
Type C = 2.400 pcs/day, CT = 5 sec, C/O = 60 min

Type D = 6.200 pcs/day, CT = 5 sec, C/O = 60 min

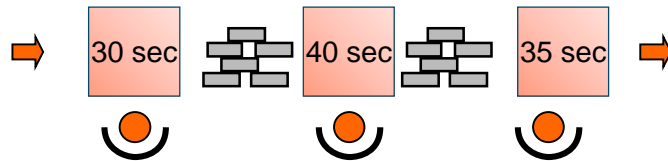
What happens with a lean flow...

... when a machine has a problem?

... if defect parts get mixed into the processes?



U-shaped-cells simplify balancing and continuous improvement

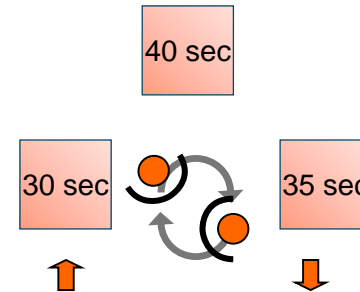


630 pcs / 7hs

40 sec / pc.
90 pcs / hr
30 pcs / operator

$$\text{Productivity} = \frac{105 \text{ sec}}{120 \text{ sec}} = \frac{30+40+35}{40+40+40} = 0,875$$

Only the bottle neck station can be used to do effective improvement!



630 pcs / 9h

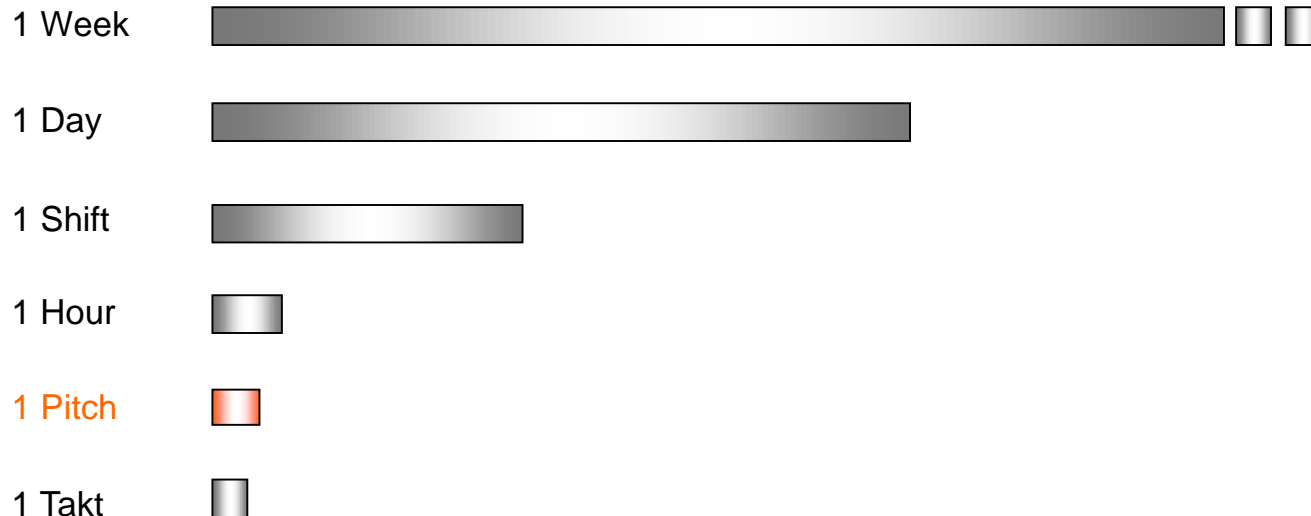
52,5 sec / pc.
69 pcs / hr
34 pcs / operator

$$\text{Productivity} = \frac{105 \text{ sec}}{105 \text{ sec}} = \frac{30+40+35}{52,5+52,5} = 1,0$$

Any improvement on any process results in an immediate optimization of the whole process!

7. „Paced withdrawal“ at the pacemaker process

- How much work do you release at the pacemaker process?
- What is your Management Pitch?
(How often do you recognise deviations between customer demand and actual production rate?)
- Do you offer a “Customer takt image” to the process operators?



Workshop-Agenda

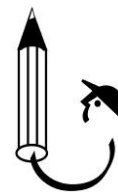
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Chapter 2 Drawing a Current State VS Map
– *practical exercise* –

Chapter 3 Features of an efficient,
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Chapter 4 Drawing a Future State VS Map
– *practical exercise* –



The 5 Questions*

1 - What is the Target Condition of this process?

2 - What is the Current Condition now?

Go to the process, Turn Card to Reflect on the Last Step



3 - What Obstacles do you think are preventing you from reaching the Target Condition?

3b - Which One Obstacle are you addressing now?

Turn Card to Detail the One Obstacle



4 - What is therefore your Next Step and what do you expect to Learn from it?

Turn Card to Detail the Next Step



5 - When can we go and see what you have Learned from taking that step?

* The 5 Questions on the front side of this Card and Question 2.1 on the rear side must be asked every time and always with the same wording as written here.

0.1- Hello [Name]! We had agreed on doing a Coaching Cycle now. Is it OK with you?

Reflect on the Learnings of the Last Step Taken

2.1- What did you Plan as your Last Step and what did you learn from it?

2.2- What did you Expect?

2.3- And what did you learn from it?/from taking that Last Step?

2.4- What actually happened?

2.5- What Value(s) have you measured?

2.6- Is there anything else you learned beyond what you already told me?

2.9- [Don't forget to praise!] Thank you! Please, let us (return to the board and) write down what we have learned so far, so that we do not forget anything.

Be very specific when describing the One Obstacle to tackle next

A very detailed understanding of root cause and it's numerical, unwanted effects are crucial in order to describe a meaningful, targeted next step! Please do not jump to solutions in this phase!

3.1- What exactly is the problem with/why...[mkw]? Can you show me, please?

3.2- Could we simulate the problem/...[mkw] right here?

3.3- What should rightly happen (so that...[mkw] can be avoided)?

3.4- Where can I see what should rightly happen (with...[mkw])?

3.5- What is actually happening (with... [mkw])?

3.6- Why/How can this mistake/this problem happen/be done?

3.7- Why is...[mkw] a problem?

3.8- What exactly is it that you do not know (about...[mkw])?

3.9- Which One Obstacle are you exactly addressing now?

Be specific when describing the Hypothesis und Experiment

Because in our Next Step we should always be testing refutable hypothesis!

4.1- How exactly will you...[mkw]? Can you show me, please?

4.2- How exactly will you take that Next Step?

4.3- And what do you expect to learn from it?

4.4- How exactly will you measure/test your expected result?

4.5- How exactly will you document your measurement(s)?

4.9- Thank you! Please, let us (return to the board and) write down what you have said so far, so that we do not forget anything.

Always take just One Step at a time

5.1- What of that next step do you think you could do today/until...[propose time]?

mkw:= try to use the mentee's key words from the last answer he gave you in your next detailing question. He will appreciate that you are actively listening to him!

The 5 Questions*

1 - What is the Target Condition of this process?

(Value Stream?/VS-Loop?)

2 - What is the Current Condition now?

Go to the Coaching Summary Board, Turn Card to Reflect on the Last Steps ➡

3 - What Obstacles do you think are preventing you from reaching the Target Condition (with your team)?

^{3b} **Which One Obstacle are you addressing now?**

Turn Card to Detail the One Obstacle ➡

4 - What is therefore your Next Step and what do you expect to Learn from it?

Turn Card to Detail the Next Step ➡

5 - When can we go and see what you have Learned from taking that step?

* The 5 Questions on the front side of this Card and Question 2.1 on the rear side must be asked every time and always with the same wording as written here.

0.1- Hello [Name]! We had agreed on doing a Coaching Cycle now. Is it OK with you?

Reflect on the Learnings of the Last Step Taken

2.0 Whom did you coach today and what did you learn from those coaching cycles?

2.1- What did you Plan as your Last Step and what did you learn from it?

2.2- What did you Expect?

2.3- And what did you learn from it?/from taking that Last Step?

2.4- What actually happened?

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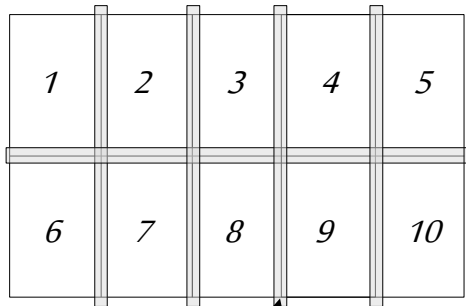
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Day's Target:	Current-Condion:	Day's Target:	Current-Condion:	Day's Target:	Current-Condion:	Day's Target:	Current-Condion:
Learned from last step:		Learned from last step:		Learned from last step:		Learned from last step:	
Next Obstacle:		Next Obstacle:		Next Obstacle:		Next Obstacle:	
Next Step + Expectation:		Next Step + Expectation:		Next Step + Expectation:		Next Step + Expectation:	
Day's Target:	Current-Condion:	Day's Target:	Current-Condion:	Day's Target:	Current-Condion:	Day's Target:	Current-Condion:
Learned from last step:		Learned from last step:		Learned from last step:		Learned from last step:	
Next Obstacle:		Next Obstacle:		Next Obstacle:		Next Obstacle:	
Next Step + Expectation:		Next Step + Expectation:		Next Step + Expectation:		Next Step + Expectation:	



**Starten your Coaching-Summary-Board with
2 x 5 Flipchart sheets taped together vertically**

2x5 Flipchartblätter hochkant



Use tape on the rear side

*Space for one
moderation card
4 boxes high*

*Max. 16 rows
for 16 Learners*

*Write names of Learners and Coaches on
white moderation cards
(not on Board!)*



Month
Calendar Week
and Day

— *Space for
Coaching-Summary-
Cards
(aprox. 5 x 8 cm)*

[illegible]

5.0 Date/Place

Synchronized with step?

Anleitung Version 5.0