SCM Core Service

Service Package for Lean Production

Juni 2010

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Introduction Contact

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- Bosch und Siemens Hausgeräte GmbH
- CocaCola Ltd.
- Continental
- Pilkington
- Alcoa S.A.
- Corus Group Ltd.
- VW/Skoda

Initial-Position, Challenge, Solution

Western production philosophy is still focused on large batch sizes.

Initial-Position

- “Where different products are manufactured in one production line, machines need to be set-up every time the product changes.”
- „ The readjustment from one product variant to another takes time. Valuable production time is wasted and downtime must be diminished.”

Some examples for the western way of thinking:

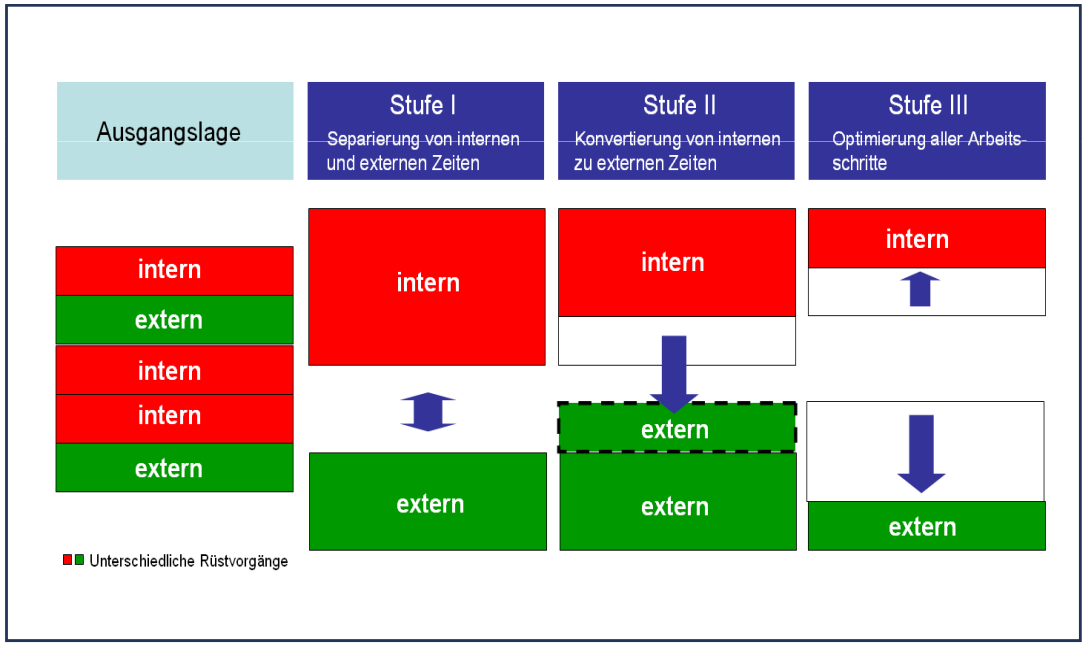
- The longer the set-up times, the more products should be fabricated in between product changes. This is leading to the following results:
  - Production is not related to customer orders, as a result you have long delivery times and little customer satisfaction.
  - High stock levels for every production step. Financial loss is due to tied-up semi-finished goods.
  - Just-in-time production is not possible.

The implementation of a strategic production concept, which is “reversing past parameters of production management.

Solution

This means turning away from a production management that is characterised by :

- large batch sizes
- small set-up volume
- Long lead times
- rigid production processes
- little responsibility in the hands of production employees



➡ … Lean Production!

Lean Production comprises a range of principles, all serving the aim of diminished loss and increased added value.

Concept Definition

Lean Production is the result of a worldwide benchmark study for the automotive industry:

- The Machine That Changed the World: The Story of Lean Production-- Toyota's Secret Weapon in the Global Car Wars That Is Now Revolutionizing World Industry by James P. Womack, Daniel T. Jones, and Daniel Roos

	GM	Toyota
gross assembly hours per 100 cars	40,7	18,0
assembly hours per 100 cars	31	16
assembly errors per 100 cars	130	45
assembly space per 100 cars	0,75	0,45
parts stock level	2 Wo.	2h

- Lean Procuction's basic principle is the elimination of waste (Muda);
  Toyota names 7 kinds of waste:
  overproduction, stocks, transportation, downtime, superfluous work, movements, repair + defects.

Classic production management compared with the Ford Production System and Lean Production

System Analogy

Ford Production System		Lean Production
View on the market from the position of an entrepreneur " What is best for us?"	⟺	View on the enterprise from the perspective of the market "What is best for the customer?"
Irregular product changes, big batch sizes / big campagnes	⟺	fast setup changes, small batch sizes
Functional organisation	⟺	Value streams, process oriented organisation
Reactive	⟺	Proactive
Detects quality problems conscientiously	⟺	Enables high-end processes
Push System	⟺	Pull System
Focus on cost	⟺	Focus on customer and on time

Our Service Package of Lean Production

Lean Production means “creating a continuous flow and eliminating waste”

Service Package

Demand oriented production “Just in Time”

Pull control

- Kanban control
- Order Production
- Smooth principles

Small batch sizes

- Mix-production
- Cycle Time Reduction
- Single Minutes Exchange of Die

Process stability

- Visual management
- Assembly line stop (“Andon”)
- Standardization

Customer-supplier-principle for every process step

Total Quality Management (TQM)

- Visual controll
- Poka-Yoke
- High level of qualification

Working Groups and Simultaneous Engineering

- Temporary working groups
- Permanent working groups
- Simultaneous Engineering (SE)

Target Costing

- Cost, based of the market
- Reduction of process cost

Concentration of adding value and continuous improvements*

Elimination of waste

- Continuous improvements (KAIZEN)
  - Muda (waste)
  - Mura (imbalance
  - Muri (overloading)
- “5 S” principles
- Six Sigma

*This Topic is the basic of all Lean Production Techniques

Objective of Kanban systems is the reduction of stocks & the improvement of flexibility with relation to altered demands.

Lean Production Techniques: Pull Controll

Kanban (english: „map“ oder „board“) is a method of the production flow control according to the pull principle and was developed by Taiichi Ohno in the japanese Toyota Motor Corporation in 1947

- The essential benefit of Kanban is the high potential of adjustment in short term alterations of the demand because with the „running-out“ of a required article the order of the supplementary production will be triggered in a timely manner.
- The disclosure of information by use of Kanban happens always actually and adjusted to the current demand situation from the consumer to the manufacturer or to the supplier.
- Kanban is a possibility for companies to transform the elaborated and intricated production control into independent control loops. This reduces the control effort and increases the transparency of the process coherencies.

Lean Production Techniques: Pull Controll

Domain and Customer Benefits

Domain

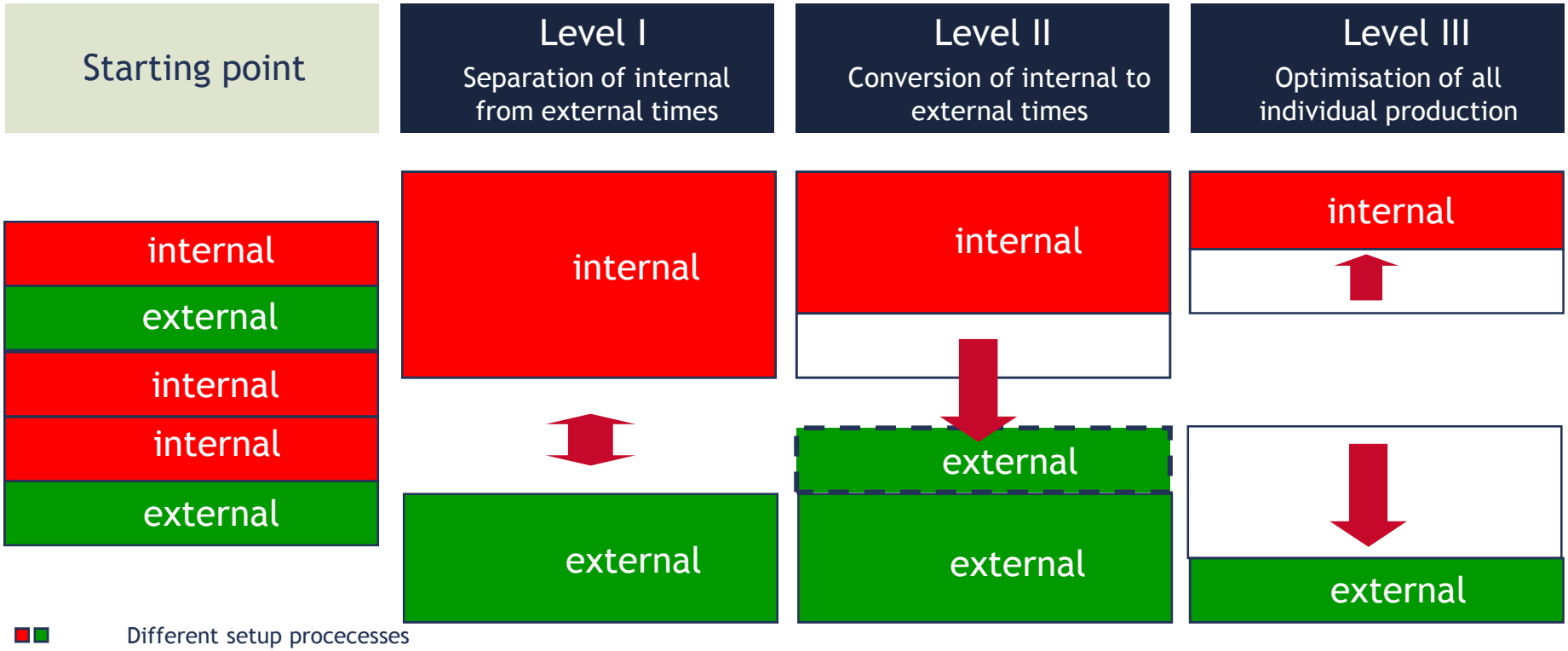
- Finish Goods-, WIP- and Purchasing-Parts
- Serial/Batch-, Discrete-, and Lot-size-Manufacturing
- Multilevel-Production-Process
- Constraint-Production-Process
- Multiple disposition of components
- Make-to-Stock production (MTS)
- High level of controlling efforts

Benefits

- Increase the capacity
- Increase the product availability
- Increase the production process stability
- Decrease the inventory
- Decrease the level of controlling efforts
- Decrease the cycle time
- Decrease the rate of rework
- Decrease the rate of scrap
- Decrease the unplanned logistic cost

The SMED philosophy guarantees the realisation of smallest batch sizes (*S*ingle *M*inute *E*xchange of *D*ies) . . .

Lean Production Techniques: Single Minute Exchange of Dies (SMED)



…. based on the rule: "the only value-added process is poduction itself."

Lean Production Techniques: SMED (Single Minue Exchange of Dies)

Domain and Customer Benefits

Domain

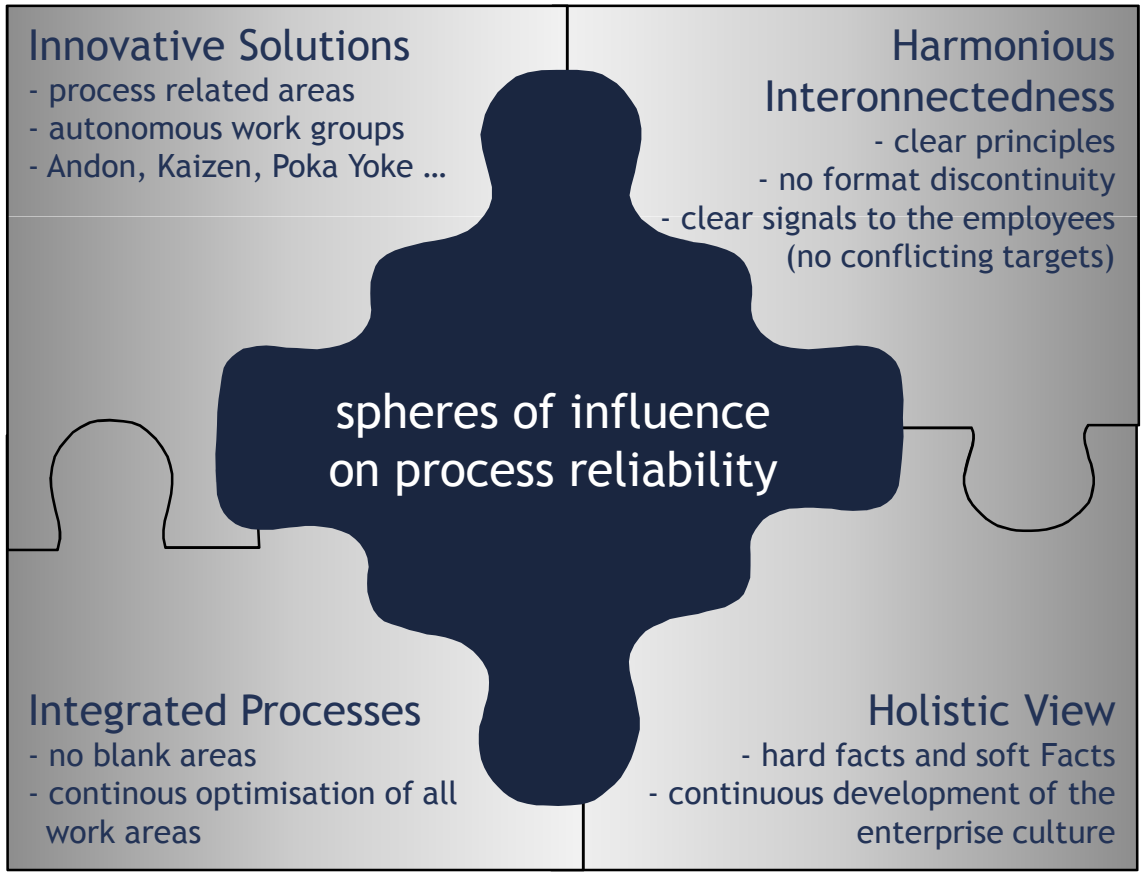
- Multiple usage machines
- Bottleneck machines
- Constraint machines
- Multilevel assembly lines

Benefits

- Increase the production flexibility
- Increase the Overall Equipment Effectiveness
- Increase the productivity
- Increase the product availability
- Increase the profitability
- Increase the operators motivation
- Decrease the set-up time
- Decrease the cycle time
- Decrease the inventory (finish goods and wip)
- Decrease the production costs

Process security is based on the integration of several spheres of influence.

Lean Production Techniques: Process stability



Lean Production Techniques: Process stability

Domain and Customer Benefits

Domain

- For *all* kind of production processes
- For *all* kind of administrative processes
- High setup level machines
- Constraint machines

Benefits

- Increase the productivity
- Increase the capacity
- Increase the production quality
- Increase the operator motivation
- Decrease the set-up effort
- Decrease the assembly line stops
- Decrease the rate of scrap
- Decrease the inventory (wip)
- Decrease the production cost

The Americans Deming and Juran are regarded as pioneers of Total Quality Management Systems (TQM)

Lean Production Techniques: Total Quality Management - TQM

- But there is one considerable difference, the focus moved away from statistics and an internal view.
- Now the focus is entirely on the customer, both internal and external, e.g. the customer-supplier relationship, and on the absolute completion of the customer's expectations.
- TQM is consequently an advancement, considering the fact that quality no longer means 'product quality' alone, but refers now to all areas of an enterprise.

TQM should be seen as a philosophy, that must be filled with live within the enterprise, compared to a mere concept for success.

Lean Production Techniques: TQM (Total Quality Management)

Domain and Customer Benefits

Domain

- For *all* kind of production processes
- For *all* kind of administrative processes

Benefits

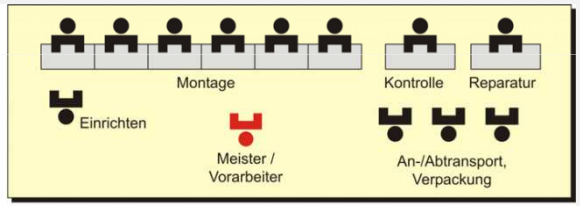
- Increase the productivity
- Increase the profitability
- Increase the capacity
- Increase the production quality
- Increase the operator motivation
- Decrease the set-up effort
- Decrease the assembly line stops
- Decrease the rate of scrap
- Decrease the inventory (wip)
- Decrease the production cost
- Decrease the re-work

A further basic principle of Lean Management is the formation of self dependant working groups.

Lean Production Techniques: Working Groups

Production Management: sequential working and function oriented

flow production (synchronised) or similar



Advantages:

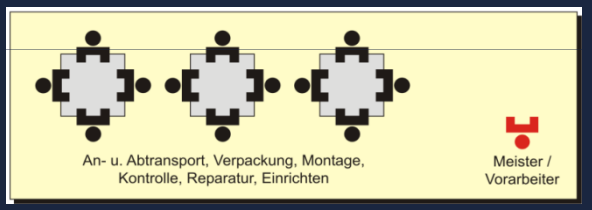
- well structured approach
- highly specified
- clear easy-to-learn working content
- efficient design of working space
- clear sequence of work procedures

Disadvantages:

- not flexible in case of impending changes in work or demand
- faults are detected late
- high cost of faults
- little information feed-back
- product not holistically optimised

Lean Management: „object oriented

self dependent working groups



Advantages :

- flexible in case of changes of demand
- improved quality
- little inactive times of employees
- cooperation across domains
- improved communication

Disadvantages:

- employees need be highly trained
- more coordination needed than with flow production

Lean Production Techniques: Working Groups

Domain and Customer Benefits

Domain

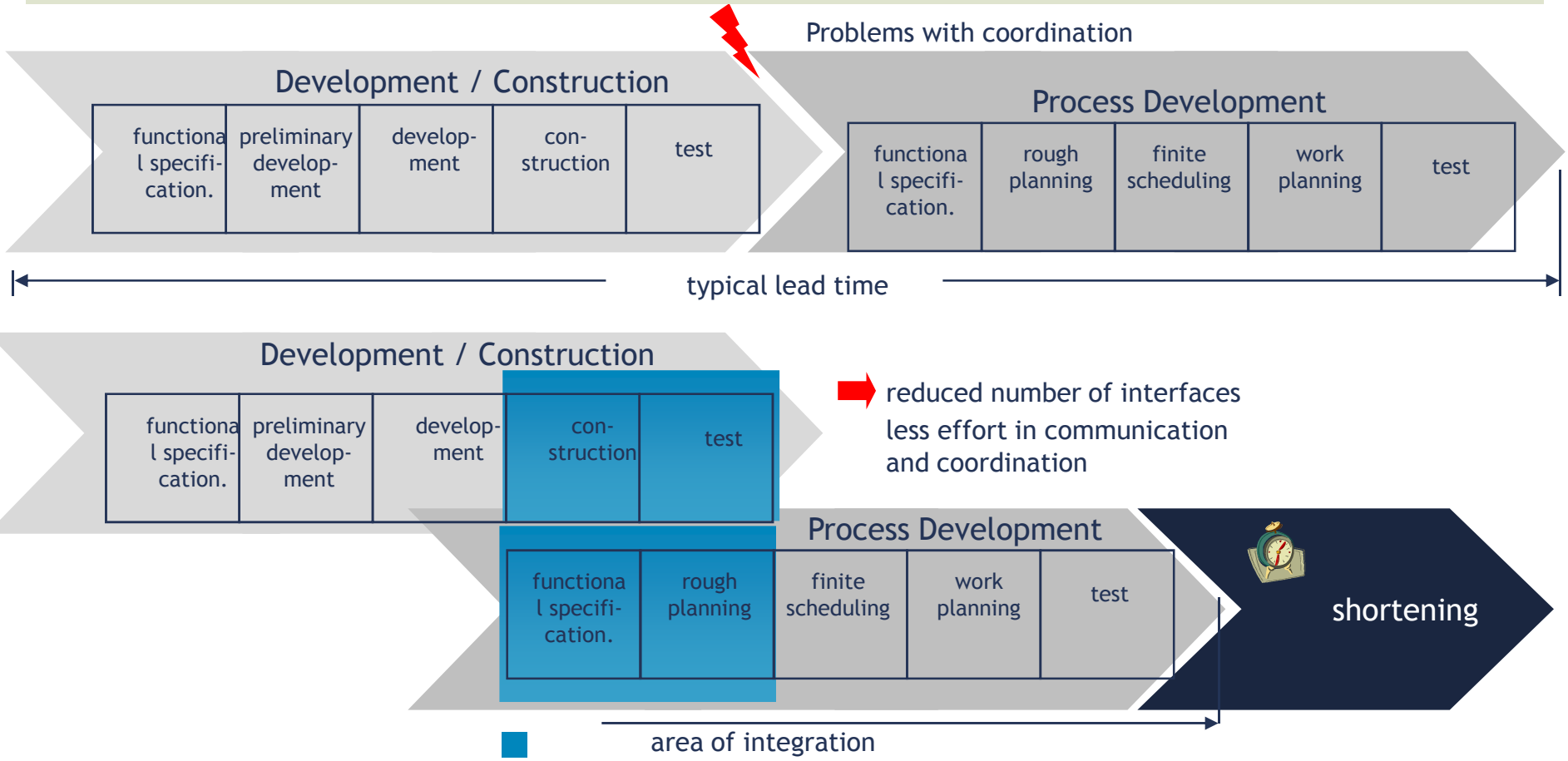
- For *all* kind of production processes
- For *all* kind of administrative processes

Benefits

- Increase the productivity
- Increase the production quality
- Increase the operator motivation
- Decrease the operators fluctuation
- Decrease the assembly line stops
- Decrease the rate of scrap
- Decrease the re-work

Enormous time savings can be realised with the synchro-nisation and parallelisation of processes

Lean Production Techniques: Simultaneous Engineering



Lean Production Techniques: SE (Simultaneous Engineering)

Domain and Customer Benefits

Domain

- Development Engineering department
- Industrial Engineering department
- Production/Shop Floor department
- Quality department
- Sales department
- Planning and Controlling department

Benefits

- Increase the product quality
- Increase the profitability
- Increase the product quality
- Increase the turn-over
- Decrease the cycle time
- Decrease the line stops
- Decrease the rate of scrap

Target costing is a cost management system, and cannot be equated with order costing.

Lean Production Techniques: Target Costing

- Target costing is an approach to be both success oriented and target oriented with your cost planning and controlling.
- Target costing is a concept for cost planning that is consequently focused on the market, applicable to
  - new products and services
  - short lifecycles
  - highly competitive markets
  - quality maintenance

Target costing goes by the question "What may a product cost?"
and not as is traditional "What will a product cost?"

Lean Production Techniques: Target Costing

Domain and Customer Benefits

Domain

- Finance department
- Sales department
- Marketing department
- Production department
- Development Engineering department
- Industrial Engineering department
- Quality department

Benefits

- Increase the turn over
- Increase the profitability
- Increase the product quality
- Increase the customer satisfaction
- Decrease the inventory

Implementation

The implementation of this Lean Production Techniques can be happen in two difference time frames: short & long term

Time Horizon

„Short Term“

- Pull Controll
- Small batch sizes (SEMD)
- Process Stability
- Total Quality Management
- Working Groups and Simultaneous Engineering (SE)
- Elimination of Profuseness, Phase I:
  - KAIZEN
  - 5 S

„Long Term“

- Elimination of Profuseness, Phase II:
  - Flux Layout (Nagare)
  - Excess Handling for Machines
- Target Costing

Our procedure of implementing Lean Production is based on two appoaches, that should set in at the same time:

Project Procedure - Approach

Top Down Approach

Characteristics

Changes of structure

- The former strategy is replaced. New responsibilities and key-figures are derived on the basis of Lean Production.
- Holistic view on external boundary conditions of strategies and rules of Lean Production.
- At first the results stay on a conceptual level.
- Application of methods as for example BPR.

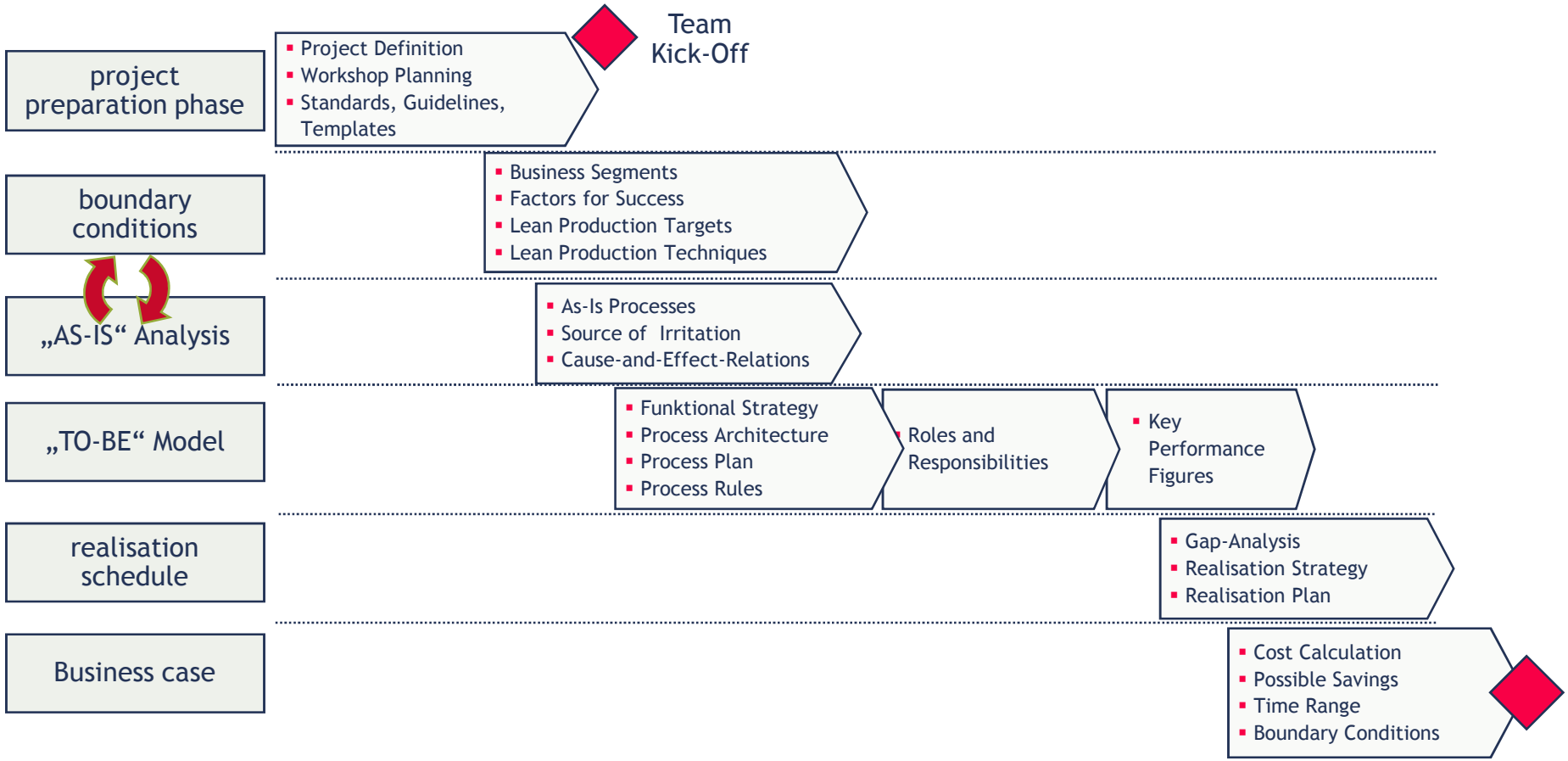
Bottom Up Approach

Optimisation of the existing solution.

- Improvement of single activities or optimal adjustment of activities within a process.
- Detailed performance measuring before the project starts.
- Detailed description of existing business processes that are relevant to the project.
- Application of methods as KAIZEN.

Results of the top down approach are a target model, a realisation schedule and a cost-benefit analysis.

Approach Content



One chracteristic of the bottom up approach is that it is realised solely by the employees of the enterprise themselves

Approach Content

Raising Awareness
- As-is Analysis-

Dedication
- Design Phase -

KAIZEN
- Implementation Phase -

- Raising Awareness: Ilustration of the targets and advantages of Lean Production. Employees identify week spots and suggest improvements.
- Dedication: Employees are trained and get to know the Lean Production modules and project methods, and if needed they receive further support.
- KAIZEN: Advancement of a corporate culture, where employees are encouraged to realise improvements quickly and unbureaucratically.

Advantages

- Identification of weak points.
- Marginal opposition during the realisation of Lean Management.
- Advancement of a corporal culture that is based on continous improvement
- Employees can relate to their work and to the enterprise.

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Thank you
for your attention