



Carlo Scodanibbio presents:

Next Generation Lean Manufacturing

” if it doesn't add value,
it is waste”

a training event organised by:

....the world has changed....

Key-Words: lean, manufacturing, power point, presentation, value, waste, client, service, industry, perform, performance, world, class, operations, adding, management, productive, process, add, time, profit, buffer, safety, inventory, finished, goods, supermarket, win, work, in, progress, continuous, flow, processing, batch, push, pull, add, volume, delivery, time, location, production, handling, stock, imbalance, handling

The Ambient is changing

Socially

Economically

Commercially

Politically

> Fluctuating Market

> Saturation

> Information

Migrations

Crime

Market Fragmentation

Technology

COMPLEXITY

11/09

Perestrojka

Patrol

> Innovation

> Care to free time

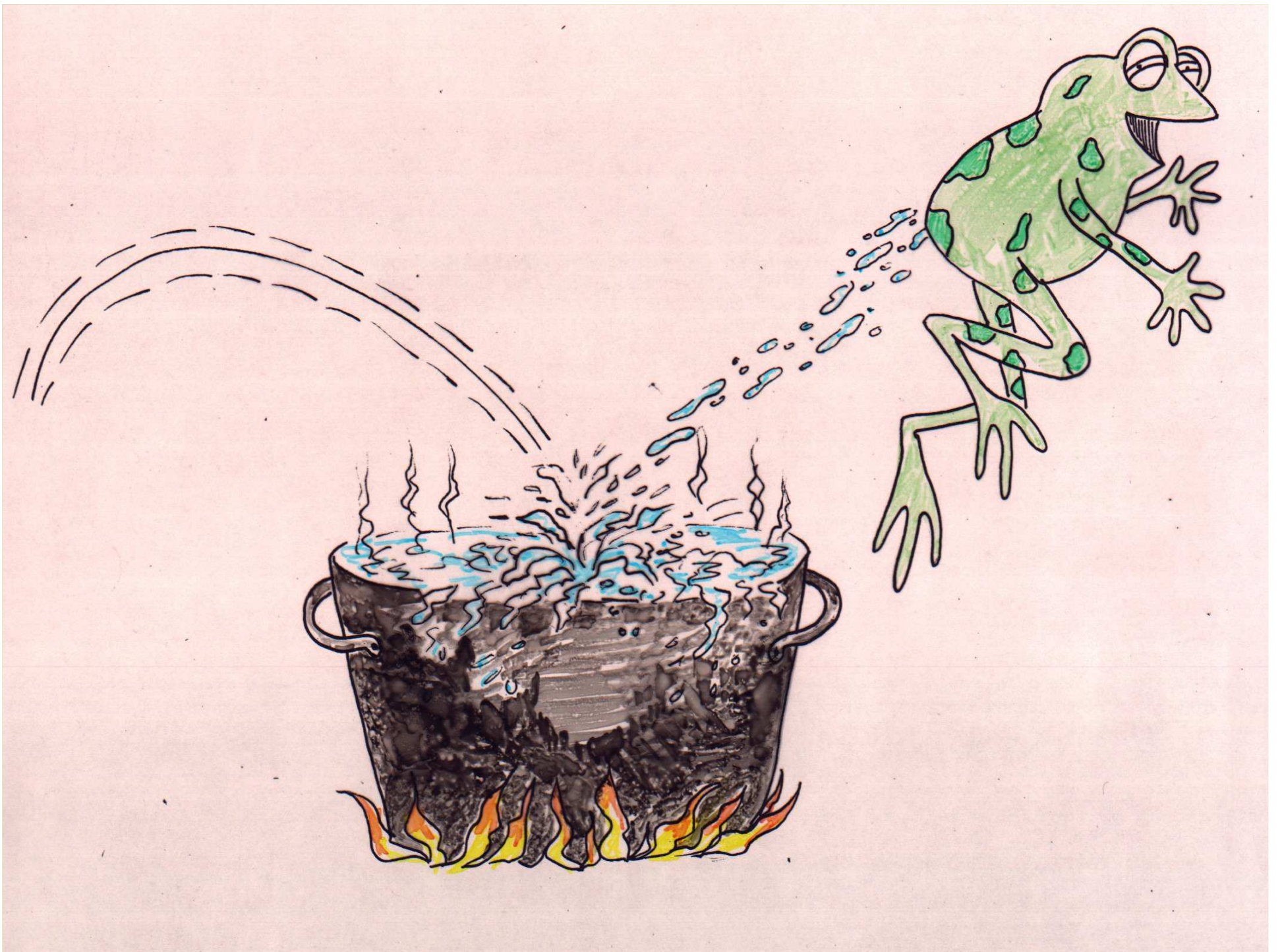
Faster and faster

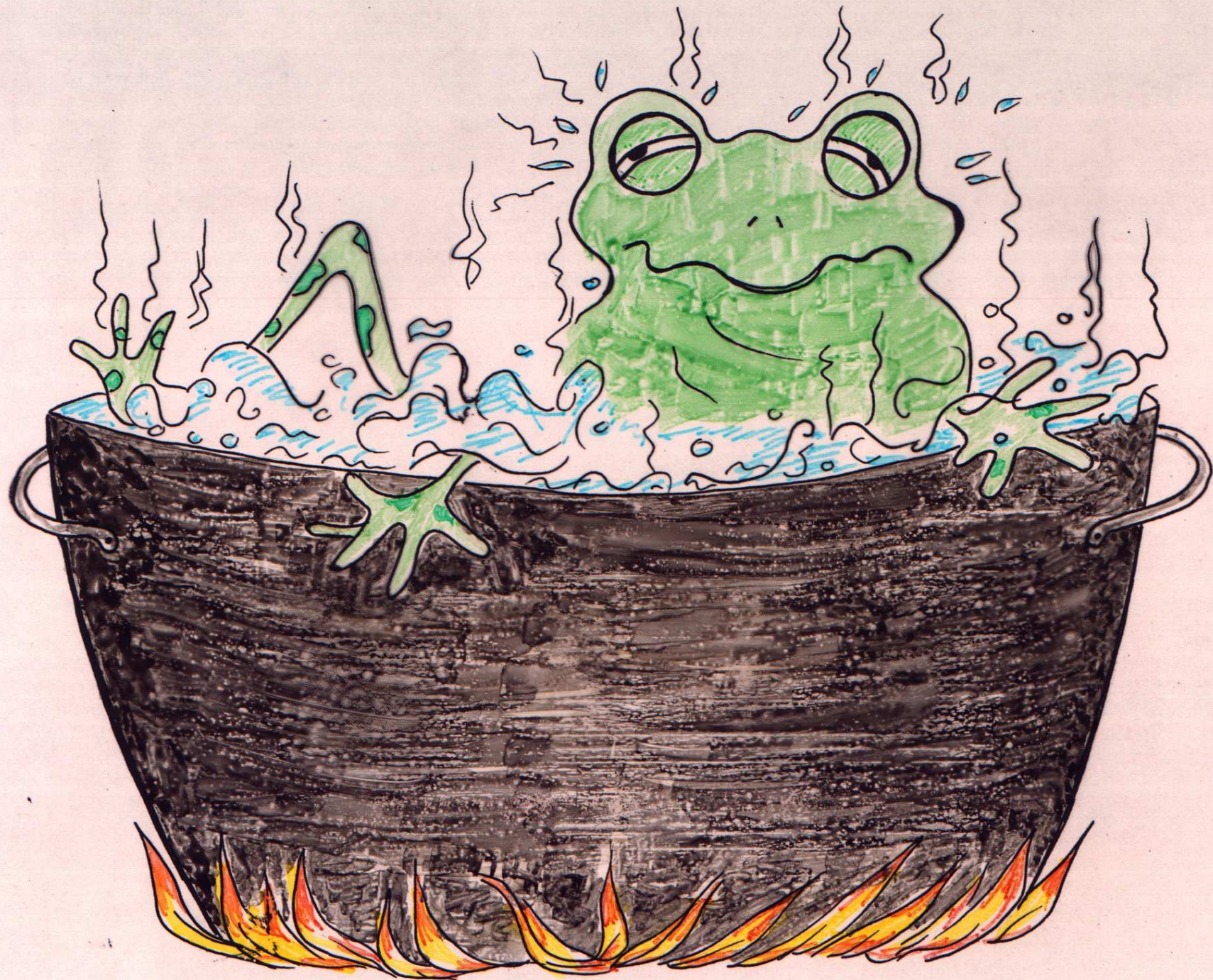
> Care to Ecology

> Attention to Quality

Terrorism

New rules





clients are monsters....



Credits: J. Barta & Boris Vallejo

manufacturing

yesterday

Approach:

Make good products
cheaply and quickly

QCD approach
(Quality - Cost - Delivery)

today/tomorrow

The present market cake is not growing much larger, but variety is, due to diversity of customers' needs. Besides, customers request and expect shorter delivery schedules, higher quality, and high reliability. This dictates a "higher variety-small lots" style of production, featuring high quality, speedy delivery and assured safety/reliability.

PQCDS approach
(diversified PRODUCTS, of high
QUALITY, at low COST, with
speedy DELIVERY and assured
SAFETY/RELIABILITY)

manufacturing

yesterday

Seller's Market

**Costs associated
with Waste could
be built into
Product's price**

today/tomorrow

Buyer's Market

**Clients are no
longer prepared to
subsidise
manufacturers'
costs associated
with **Waste****

manufacturing

yesterday

**Factory Management
determines Production
Capacity**

(Estimate-based Levelling)

Costs + Profit = Selling Price

(Product-Out approach)

today/tomorrow

**Customers determine
Production Capacity**

(Reality-based Levelling)

Selling Price - Profit = Costs

(Market-In approach)

manufacturing

yesterday

Profit is something that comes naturally out of the manufacturing and marketing process

Manufacturing Cycle Time

>> Selling Cycle Time

today/tomorrow

Profit is something that must be created and earned through hard work

Manufacturing Cycle Time

-> = Selling Cycle Time

manufacturing

yesterday

Manufacturing
is the business
of making
products

today/tomorrow

Manufacturing
is a
SERVICE
INDUSTRY

why enterprises don't "perform"...

....the root causes of poor performance date
back to over 2 centuries ago.....

*....we have gone into the
21st century, with
enterprises designed in the
18th and 19th centuries to
perform well in the 20th.....*



WORLD CLASS MANUFACTURING

WORLD CLASS
APPROACH
TO MARKET

WORLD CLASS
PRODUCT
DEVELOPMENT

WORLD CLASS
OPERATIONS

WORLD CLASS
RELATIONSHIP
WITH SUPPLIERS



the direction

new performing systems

V A M

Value Adding Management
search for excellence continuous systematic improvement orientation to client culture and values

S

E

W

Systematic

Elimination

of Waste

LM

Lean Manufacturing

TQM

Total Quality Mangmt

TPM

Total Productive Mainten.

PROCESS

- < Lead Time
- < Stock
- > Flexibility
- > Productivity

PRODUCT/SERVICE

- 100% Quality
- Zero Defects

EQUIPMENT

- > Efficiency
- > Utilization
- < Losses

T
Total

Participation

E
Employee

Creativity

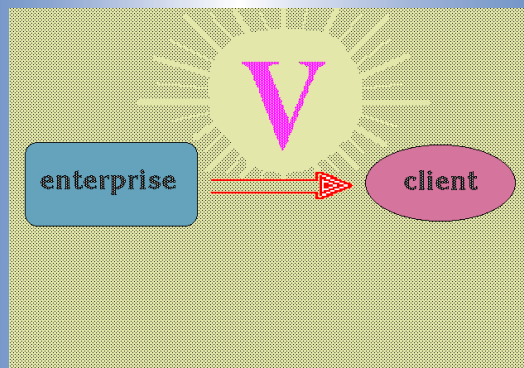
I
Involvement

Challenge

world-class manufacturing operations

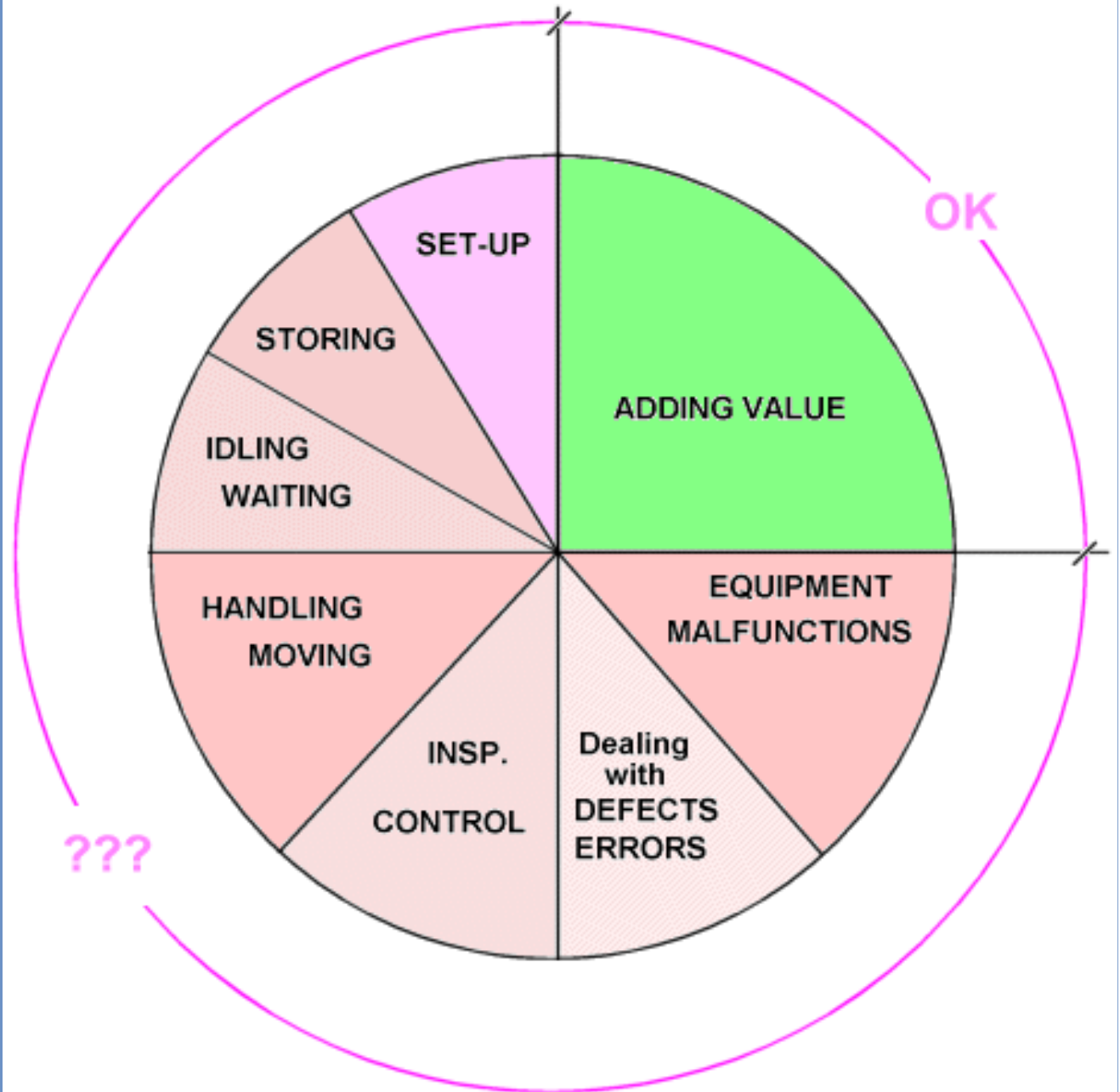
VAM

VALUE ADDING MANAGEMENT



the VAM approach to the productive process

*process
time
analysis*



homework ?

..oh, yes !!!

**SEW
SYSTEMATIC
ELIMINATION OF WASTE**

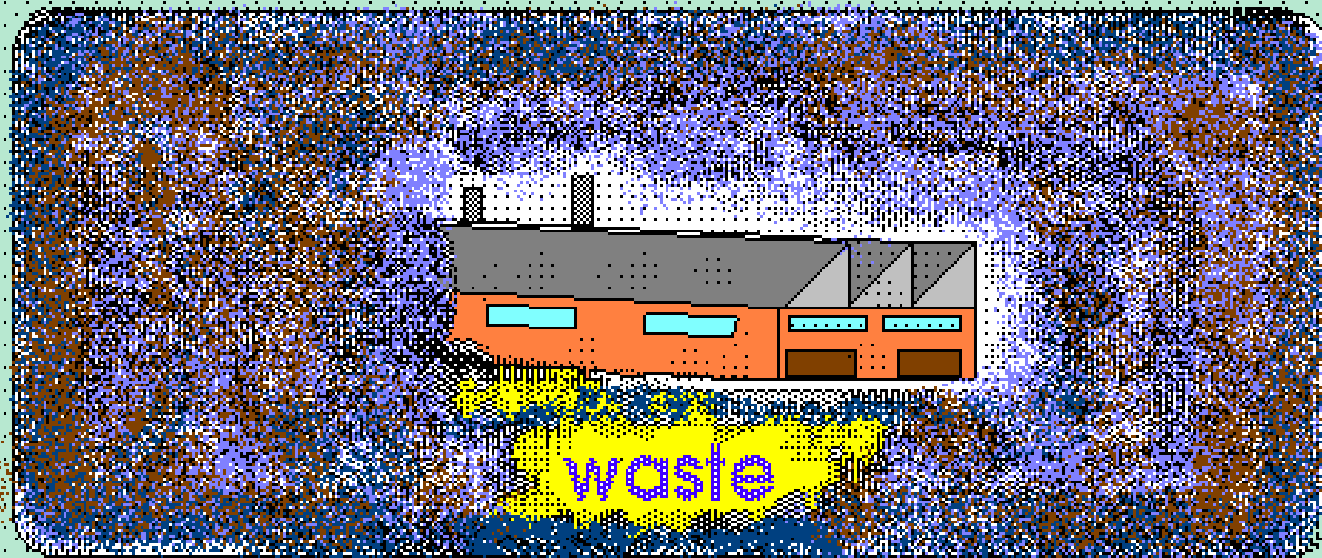
VALUE!



**WASTE DOES NOT ADD
ANY VALUE**

FIGHTING WASTE IN PRODUCTION

...in many factories waste has proliferated to such an extent that waste is no longer in the factory, but rather the factory is IN the waste...



FIGHTING WASTE IN PRODUCTION

CLASSIFICATION OF WASTE

MAN

- Waste in Processing
- Walking Waste
- Moving Waste
- Watching Waste
- Talking Waste
- Searching Waste
- Idling Waste

MATERIAL

- Waste of Materials
- Waste of components
- Size Waste
- Properties Waste

EQUIPMENT

- Capacity Waste
- Features Waste
- Utilization Waste
- Breakdowns Waste
- Reduced Speed Waste
- Air Processing Waste
- Idling Waste

MANAGEMENT

- Waste in meetings
- Waste in Supervision
- Waste in Control
- Waste in Bureaucracy
- Waste in Paperwork

METHODS

- Conveyance Waste
- Retention Waste
- Lot Production Waste
- Stockpiling Waste

QUALITY

- Inspection Waste
- QC Waste
- Defect Producing Waste
- Repairing Waste
- Re-working Waste
- Degrading Waste
- QC Equipment Waste

SAFETY

- Inadequate Prevention Waste
- Accidents Waste
- Loss of Time Waste
- Reporting Waste

SUMMARY OF THE MAIN TYPES OF WASTE

➤ **Overproduction**

➤ **Stock**

➤ **Un-needed processing steps**

➤ **Motion**

➤ **Control**

➤ **Defects**

➤ **Waiting/idling**

➤ **Transportation**

WASTE – THE TABLE OF EXCUSES - OLD

- 1) That's the way we have always done it
- 2) I didn't know you were in a hurry for it
- 3) That's not in my department
- 4) No one told me to go ahead
- 5) I am waiting for an OK
- 6) That's his job - not mine
- 7) Wait till the boss comes back & ask him
- 8) I forgot
- 9) I didn't think it was very important
- 10) I'm so busy I just can't get around to it
- 11) I thought I told you
- 12) I wasn't hired to do that

WASTE – THE TABLE OF EXCUSES - NEW

- 1) That's the way we have always done it
- 2) There is no better way, believe me....
- 3) This way we know it works....
- 4) Why change? We are already so busy....
- 5) We have tried in the past, and it didn't work...
- 6) Managers and consultants.... Only able to mess us up
- 7) You mean we are stupid the way we do it???
- 8) Impossible
- 9) We need stock: it's a good investment
- 10) Set-up time cannot be reduced further....
- 11) We must control quality or clients will complain
- 12) All machines eventually give problems

movie time

spot the waste!

definitions

**the productive process
in manufacturing**

the productive process in manufacturing

some definitions

PROCUREMENT LEAD-TIME

Interval of time elapsing between issue of order and goods' readiness for production

PROCESSING LEAD-TIME (or "THROUGHPUT TIME")

Interval of time elapsing between moment of availability of input materials/components and moment of availability of 1st output product (quasi-product, sub-assembly....)

[Mather, 1988]

the productive process in manufacturing

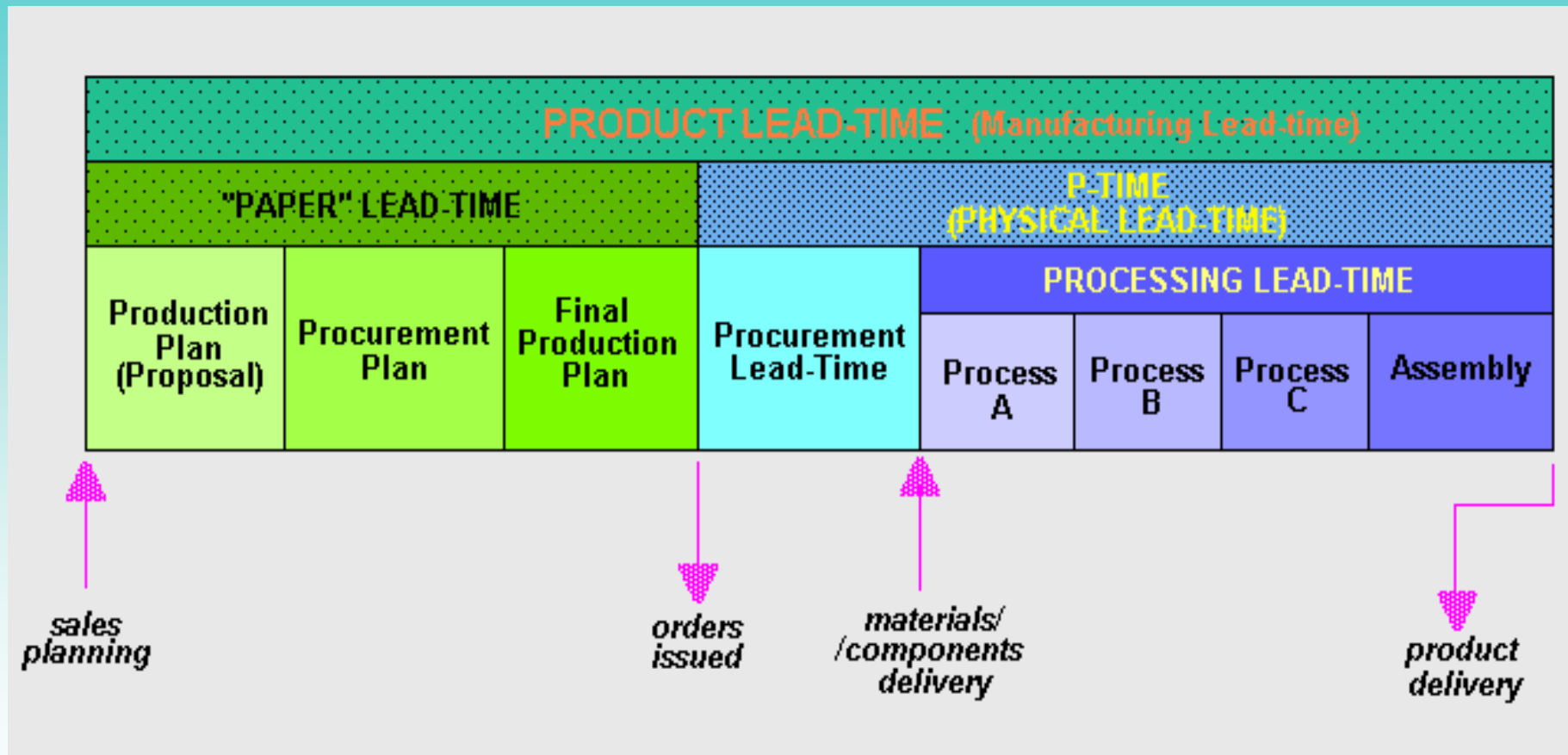
some definitions

P-TIME (PRODUCTION TIME or
PHYSICAL LEAD-TIME)

**Cumulated Lead-Time = Procurement Lead-Time +
Processing Lead-Time**

the productive process in manufacturing

some definitions



the productive process in manufacturing

some definitions

D-TIME (DELIVERY TIME)

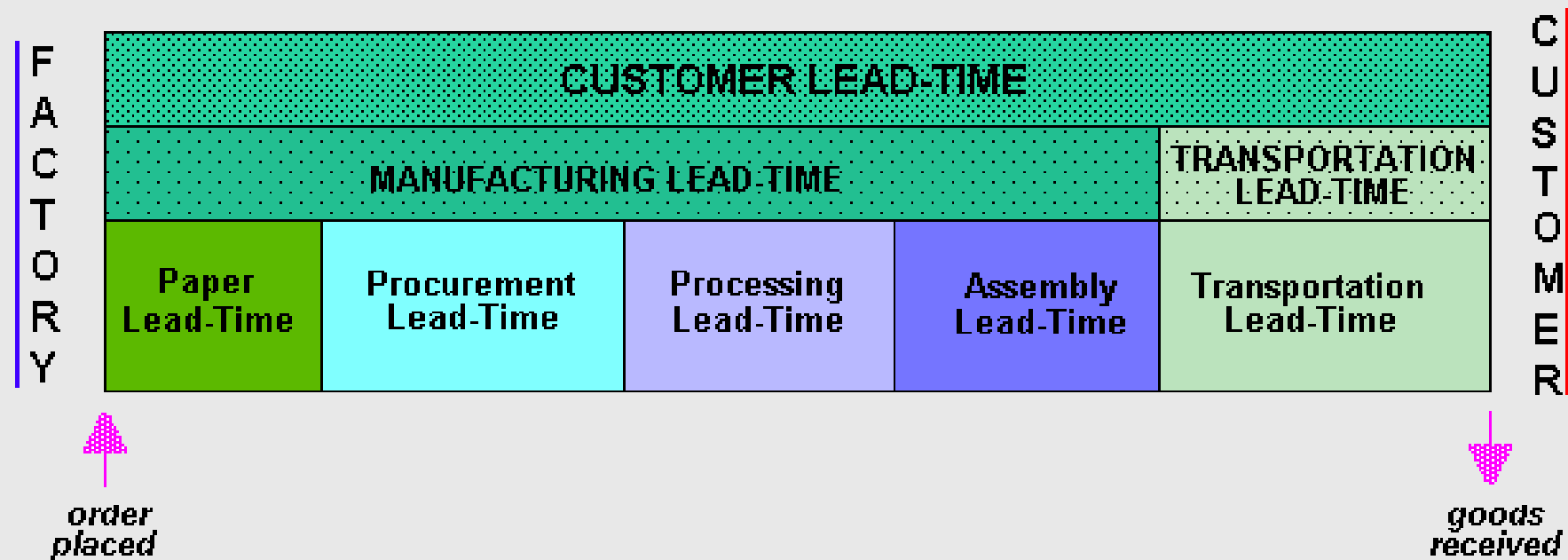
Interval of time between client's placement of order and client's desired/expected order shipment

the productive process in manufacturing

some definitions

CUSTOMER LEAD-TIME

Interval of time between customer's placement of an order and customer's receipt of goods ordered



the productive process in manufacturing

some definitions

the CUSTOMER LEAD-TIME

is a REAL Lead-Time, generally not short enough to meet the customers' delivery deadlines....

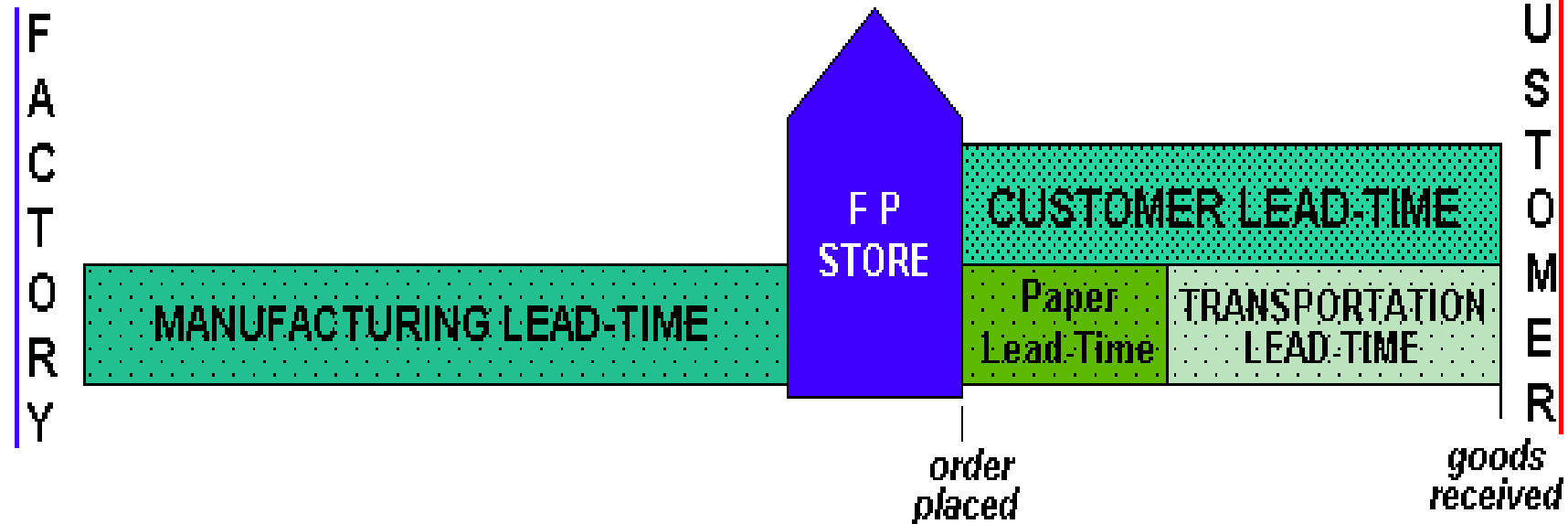
"....customers are very picky people. They tend to want all of a sudden products that they did never even bother to look at before. And when they want them, they want them now. Customers have long ago embraced the JIT concept...."

the productive process in manufacturing

some definitions

“catalogue” manufacturing

TRADITIONAL SOLUTION: THE FP STORE



the productive process in manufacturing

some definitions

“catalogue” manufacturing

this is a shorter Customer Lead-Time, but is a DUMMY LEAD-TIME

the FP Store is supposed to make up for the disadvantage of having a Manufacturing Lead-Time, and becomes a "thick wall" between factory and customer - the thicker the FP Store wall, the less able the factory to respond quickly to market changes

a strong, health factory is one that can meet needs for prompt delivery based on REAL Lead-Time

the productive process in manufacturing

some definitions

“order” manufacturing

TRADITIONAL SOLUTION

Accommodate a new Customer Order to fit into actual Production Plan or decline new Order.

If new Order can be “squeezed in”, often this may only be done at the expenses of delaying Orders-on-hand through a Production Plan reschedule.

the productive process in manufacturing

some definitions

CYCLE TIME

Referred to a repetitive operation: the overall time required to carry out a repetitive processing activity (including load/unload, inspect, walk....)

MANUFACTURING CYCLE TIME

Sum of all Cycle-Times necessary to carry out all operations required to manufacture a product

the productive process in manufacturing

some definitions

SELLING CYCLE-TIME ("PITCH TIME" - "TAKT TIME")
Referred to a production lot: minutes and seconds that "should take" to process parts, quasi-products or finished products according to amount and D-Time specified in Customer's order

$$\text{Takt Time} = \frac{\text{total daily operating time}}{\text{total daily requirement}}$$

the TAKT TIME is a parameter related to Customer's Demand Rate, and gives an indication of "how long" operations should take

the productive process in manufacturing

some definitions

TAKT TIME - EXAMPLE

PRODUCT: Brake Cylinder
PRODUCT CODE: BC 0183

MONTH PRODUCTION SCHEDULE

22 Working days
2 Shifts of 8 Hours each

Theoretical working time per shift	(h:min)	8:00
Breaks & precautionary resting time	(h:min)	0:20
Effective working time per shift	(h:min)	7:40
Effective working time per day	(h:min)	15:20
Effective working time per day	(sec)	55.200

REQUIREMENT

Monthly requirement	(pieces/month)	18.000
Daily requirement	(pieces/day)	818

$$\text{TAKT TIME} = \frac{\text{EFFECTIVE WORKING TIME PER DAY } 55.200 \text{ (seconds/day)}}{\text{DAILY REQUIREMENT } 818 \text{ (pieces/day)}} = \mathbf{67 \text{ (seconds/piece)}}$$

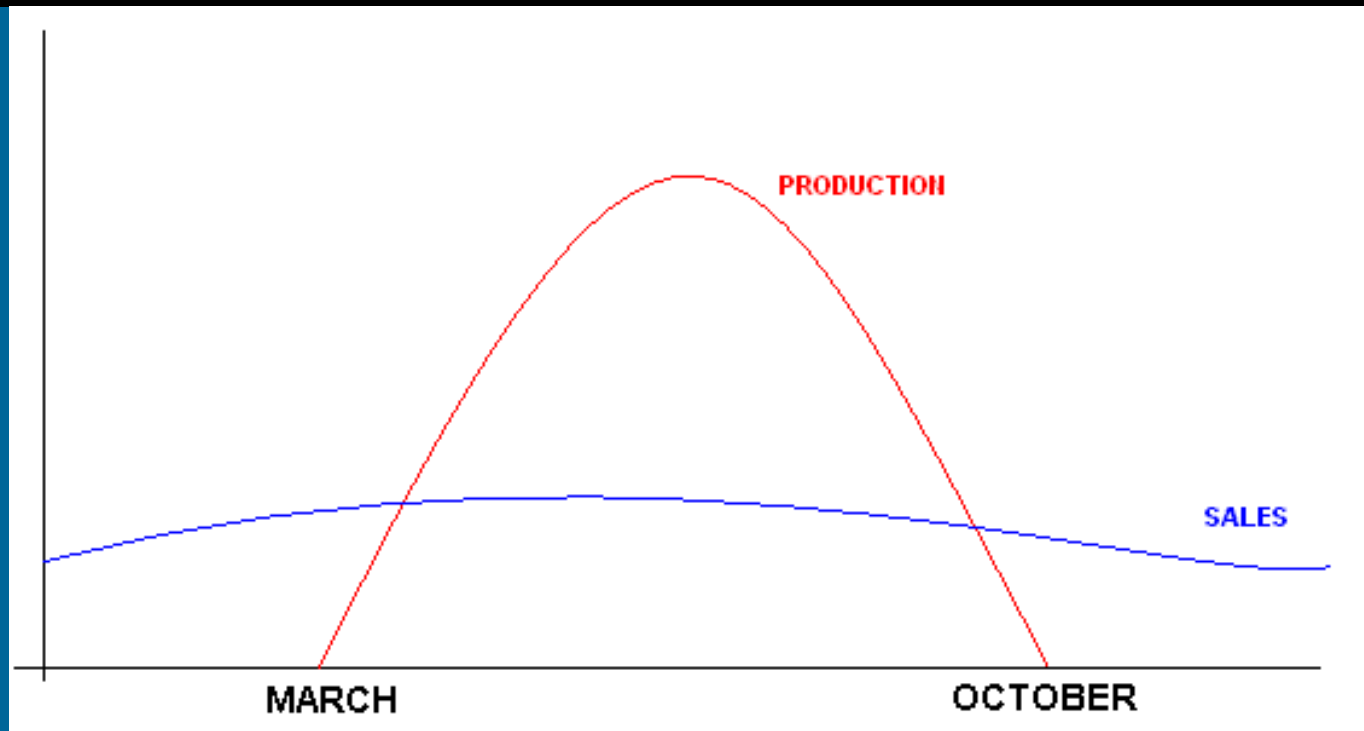
movie time

spot the waste!

Manufacturing Industry - 2

OVERPRODUCTION

FACTS AND FIGURES



Current sales: 500.000 packs/year – slight peak in summer

Current production (only from March to October): 18.000 packs/day (8 hours)

Current TAKT: $6.336.000/500.000 = 12,6$ seconds

Current speed of production: $28.800/18.000 = 1,6$ seconds/pack

Production Speed: 7,8 times faster than TAKT

LEAN MANUFACTURING

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