Ten Principles for World Class Process Improvement

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COLLEGE OF ENGINEERING & TECHNOLOGY
Principle No. 1

World-class companies know what is value-added and what is not for their customers!
Support Core Processes

- Planning
- Purchasing
- Suppliers
- Expediting
- Receiving
- Inspection
- Suppliers
- Planning
- CAD System
- Production Engineering
- Shop Floor Data Collection
- Management
- Accounting
- Distribution
- Automated Warehouse
- Robot
- Supervision
- WIP
- Customers
- Manufacturing
- Indirect Labor
- Stores/Kitting
- Materials Handling
- Shop Floor Data Collection
- Accounting
- Management
- CAD System
- Expediting
- Receiving
- Inspection
- Suppliers
- Planning
- Purchasing

Institute of Industrial Engineers’ Webinar July 15th, 2014
Which would you buy?

* **Supplier A**
  - Basic cost: $499
  - Other costs: None
  - Total costs: $499

* **Supplier B**
  - Basic cost: $449
  - Better processes: $90
  - Total costs: $539

CUSTOMERS WANT

QUALITY

VALUE

RELIABILITY

PRICE

SERVICE

Not one, but all!
We always want the best value!

And so does everyone!

Always provide the best value to customers!
Principle No. 2

World-class companies know that customers will not support inefficiency & incompetence!
Rise of Toyota

- Eiji Toyoda: passed away recently at age 100
- Developed efficient, low-defect manufacturing processes
- Visited Ford plant in 1950
- Toyota was making 2,500 cars per year
Rise of Toyota

- Saw Americans were buying European cars!
- Was convinced that Americans will buy his cars!

http://www.graphixshare.com/uploads/posts/2012-10-03/1349287994_5c3823fd6cf84d16e50552497f3cac7b.jpg
Lesson

- Customers will not support inefficiency!
- Customers do not want to do charity!
- Slogans are futile!
Only the best will survive!

Innovate & Succeed

Battle for top spot
Toyota is now the leader in world auto sales, a title GM had held for 77 years.

Annual vehicle sales worldwide

Source: Global Insight, General Motors, Toyota
The Detroit News
World-class companies ensure that each moment of every employee is used to provide value to customers!
Why should we be competitive?

• All effort is paid by the customer!

• Customers only want to pay for work that they think is value-added!

Develop Employees

http://panorama-consulting.com/wp-content/uploads/2012/03/Lean-Six-Sigma-300x235.png

http://www.toonpool.com/user/589/files/ethics_354305.jpg

http://2.bp.blogspot.com/-taPob-SU3yk/TaLeTMQJcgI/AAAAAAAAJHs/xhXOAGJW2OA/s1600/Baldrige_Award_Lo

http://deepgreenpermaculture.files.wordpress.com/2010/08/rightandwrongdecisions.jpg

http://www.toonpool.com/user/589/files/ethics_354305.jpg
World-class companies invest in employees and treat them as humans!
Encourage Balanced Employees!

I’m afraid you’ll have to stay late tonight, I want you to attend this talk on work–life balance.


http://4.bp.blogspot.com/-0ts09StEo70/ULY40-7ZLXi/AAAAAAAABxc/6w70oa4fb1E/s1600/Work_Life_Balance+++form2220h.jpg
Who touches your customers?

- CEO
- COO
- CFO
- President
- Vice-presidents
- General managers
- Sales managers
- Marketing managers
- Department managers
- Supervisors
- Customer service reps
- Sales people
Motivate employees who meet and interact with customers!
Insist to do it right the first time!

When we dig a hole, we do it right! You should have known!

Hope you survive the night ..... good bye!

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http://ryansdadcomic.com
Customer satisfaction is directly proportional to employee satisfaction!
Principle No. 5

World-class companies build high performance teams!
High Performance Teams

What do high performance teams have that others don’t?

Skills  Dedication  Communication
In high performance teams, each team member is committed to make others the best they can be?
World-class companies use best practices in process improvement!
Lean Six-sigma

• Lean is the continuous pursuit of waste reduction

• Six-sigma is the relentless pursuit of quality through variation control

• Lean Six-sigma process
  - No wasteful activities
  - Only 7 rejects or errors in 2 million!
Document all processes!

- No hidden knowledge!

- If you can't describe what you are doing as a process, you don't know what you're doing.”

W. Edwards Deming
• Value stream: a process that increasingly adds value to the output from the customer’s point of view
Processes are Baton Races!

- Treat process output as a baton in a relay race ... customer is waiting for the baton!

- Effort to move baton is only paid for!

- Eliminate delays between activities!

http://www.aplcresearch.com/Baton%20passing.jpg
Use Flow Charts!

Clerk
- Activity 2
- Activity 4

Loan Officer
- Activity 3
- Activity 6

Manager
- Activity 5

Underwriter
- Activity 7
**Current State Map**

![Diagram of the current state of production and operations]

- **Suppliers**
  - Monthly Orders
- **Production Control**
  - Daily Production Schedule
  - 3/6/9 Month Forecasts
  - 12 Week Forecast
  - Daily Actual
- **Customers**
  - Requirement = 8,000 mirrors / day
- **MOLDING**
  - T/T = 85 secs
  - C/O = 2 – 8 hours
  - Yield = 85%
  - Multiple machines
  - People = 12
  - Shift = 1
  - Uptime = 85%
  - Plastic Pellets
  - 20,000 R
  - 20,000 L
  - 10.4 days

- **PAINT**
  - T/T = 120 mins
  - C/O =
  - Yield = 60%
  - Multiple machines
  - People = 4
  - Shifts = 2
  - Buff Loop = 30%
  - 5 days

- **Curing & Sequencing**
  - T/T = 45 secs
  - C/O =
  - Yield = 90%
  - Multiple stations
  - People = 8
  - Shifts = 2
  - Uptime = 85%
  - 45 secs

- **ASSEMBLY**
  - T/T = 45 secs
  - C/O =
  - Yield = 90%
  - Multiple stations
  - People = 8
  - Shifts = 2
  - Uptime = 85%
  - 4,000 R
  - 4,000 L

- **INSPECT**
  - T/T = 15 secs
  - C/O =
  - Yield = 100%
  - Single station
  - People = 1
  - Shifts = 2
  - Uptime = 85%
  - 15 secs

- **SHIPPING**
  - Buff Loop
  - Lead Time = 29.4 days
  - VA Time = 123 mins
  - 32,000 R
  - 32,000 L

- **Weekly**
- **Monthly**

**Operational Metrics**

- **No profits for 2 ½ years**
- **Defects = 27,000 PPM**
- **Scrap = 33%**
- **Fortune on transportation**

**Rolled Throughput Yield (RTY)**

\[
\text{Rolled Throughput Yield (RTY) = 0.85 \times 0.60 \times 0.90 \times 1.0 = 0.459 or 46%}
\]
 Rolled Throughput Yield (RTY) = 0.95 × 0.80 × 0.98 × 1.0 = 0.7448 or 75%

Lead Time = 8.5 days
VA Time = 123 mins
Know %VAT for Core Processes!

- VAT ratio = \( \frac{\text{sum of activity times}}{\text{lead time}} \)

- \%VAT = \( \frac{30}{120} \times 100 = 25\% \)

- For all priority processes: \%VAT = 100\%

For most processes %VAT is below 5%!
Reduce Lead Time

- Define process start and end points
- Lead time = time between start & end points
- Lead time is what the customer sees!
- Reduce lead time first!
TIM WOOD

Helps Processes Become Lean

- Inventory/Storage Waste
- Motion Waste
- Waiting Waste
- Over-Processing
- Over-Production
- Defects Waste
- People Talent Waste
- Transportation Waste
Principle No. 7

World-class companies:

Capture company knowledge and improve company information systems
No Hidden Knowledge!

• Create company knowledge database
• Skill is the enemy of Lean!
• Not skills, but standard work and checklists
Systems Decay …..

- Due to problems in initial implementation
- Unclear upfront goals
- Incompatible computer interfaces
- Lack of clarity
- Training
- Lack of local experts
World-class companies:

Eliminate batch flow, standardize processes and use checklists
Discourage Batch Flow

- Activity time for each activity = 1 min per piece
- What will be the lead time to complete the batch?

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Dan 😞
Encourage Continuous Flow

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Create Cellular Process Areas

Traditional Layout

1. Customer Service
2. Purchasing

Lean Work Area

RFQ

Engineering

Hours

Minutes

Customer Service

Quoting

Customer

RFQ

Minutes

Hours

Create Cellular Process Areas

Queue time (Days)

RFQ = Request for quote

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Our Process Environment

• On the job training!

• Everyone is allowed to work the way they see fit!

• Everyone is unique and so works differently!

http://www.inlinguamalta.com/about-us/
Standardize Processes

• All do it one way!
• All take the same time!
• All achieve the same quality!
• Easy to control, train and cross-train!

Is Innovation Lost?

• Show innovation that everyone agrees on!
• Standardize the process and activities!
• Change requires everyone to discuss and accept new process!
Use Checklists

- Not a crutch, but aid for memory!
- Not extra skill, but standardize!

- What was the weapon?
- 6000 drugs
- 4000 procedures

http://geoffmcdonald.com/atul-gawande-checklist-manifesto/
Principle No. 9

Quality is everyone’s job!

Quality in all you do ..... Products, processes, workplace, organization
Messy People are Productive!

• I am messy but my work is **top grade**!
• I might be messy, but I **never** make mistakes!
• I can find things easier **this way**!

Do you buy that?

http://www.impactlab.net/2007/03/22/messy-people-are-more-productive/
Organize Your Work Space

- SORT
- SET IN ORDER
- SHINE
- STANDARDIZE:
- SUSTAIN:
Organize your workspace!

The time to clean tables is when the restaurant is empty!

Dave Thomas
First Pass Yield

• If 45 satisfied outputs resulted from processing 60 at an activity station what is the first pass yield?

• First Pass Yield (FPY) ratio  
  = (# accepted)/(# handled)

• FPY ratio = 45 / 60 = 0.75
• %FPY = 75%

For transactional processes, use percent complete & accurate: %C&A
Rolled Throughput Yield

- Yield for entire process
- \(FPY_A = 90\%\), \(FPY_B = 94\%\), and \(FPY_C = 97\%\)

\[\text{RTY ratio} = 0.90 \times 0.94 \times 0.97 = 0.82\]
\[\%\text{RTY} = 0.82 \times 100 = 82\%\]
Track quality of work: in production and the office!

What is not measured, is not important!
What is measured can only be controlled!
Principle No. 10

Establish and Monitor Key Metrics!

Track Center & Dispersion
How many of you will go to a game where no score is kept?

People like to know what the score is!
Which weapon is better?

Weapon A

Weapon B
Track Center & Dispersion

Average and range or standard deviation

$\mu$ & $\sigma$
Closing Thoughts

• We are what we repeatedly do;
  ➢ Excellence, then, is not an act but a habit!
    Aristotle

• Live as if today is your last day;
  ➢ Learn as if you are going to live forever!
    Mahatma Gandhi

• It is not necessary to change;
  ➢ Survival is not mandatory!
    Edward Deming