

March 2006

# **The Toyota Way**

**John Shook**

# I'm going to talk about Toyota, but...

That doesn't mean I think Toyota is "perfect".

The point is not "Toyota". (I'm not trying to sell you a Toyota.)

It's not about Toyota; it's not about cars.

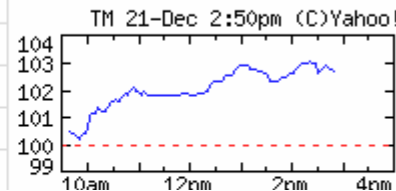
# Thought Question

- **Why is Toyota so successful?**

# Why Study Toyota?

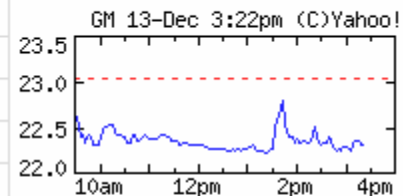
## TOYOTA MTR CP ADS (NYSE:TM) Delayed quote data Edit

Last Trade:	<b>102.6201</b>	Day's Range:	100.17 - 103.08
Trade Time:	2:50PM ET	52wk Range:	70.95 - 100.80
Change:	<b>↑ 2.6601 (2.66%)</b>	Volume:	760,900
Prev Close:	99.96	Avg Vol (3m):	399,075
Open:	100.50	Market Cap:	166.90B



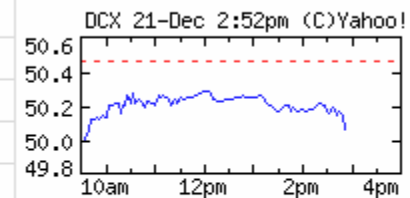
## GEN MOTORS (NYSE:GM) Delayed quote data Edit

Last Trade:	<b>19.26</b>	Day's Range:	19.25 - 20.69
Trade Time:	2:52PM ET	52wk Range:	19.63 - 40.82
Change:	<b>↓ 0.59 (2.97%)</b>	Volume:	39,370,600
Prev Close:	19.85	Avg Vol (3m):	14,101,500
Open:	19.33	Market Cap:	10.89B



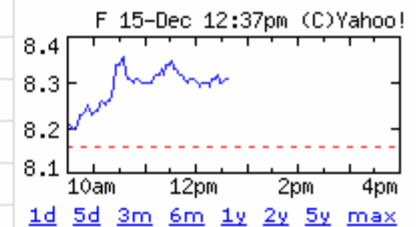
## DAIMLERCHRYSLER AG (NYSE:DCX) Delayed quote data Edit

Last Trade:	<b>50.06</b>	Day's Range:	50.00 - 50.32
Trade Time:	2:52PM ET	52wk Range:	38.77 - 55.15
Change:	<b>↓ 0.41 (0.81%)</b>	Volume:	276,600
Prev Close:	50.47	Avg Vol (3m):	581,015
Open:	50.00	Market Cap:	50.84B



## FORD MOTOR CO (NYSE:F) Delayed quote data Edit

Last Trade:	<b>8.09</b>	Day's Range:	8.01 - 8.25
Trade Time:	2:54PM ET	52wk Range:	7.57 - 15.00
Change:	<b>↑ 0.04 (0.50%)</b>	Volume:	13,980,400
Prev Close:	8.05	Avg Vol (3m):	17,178,100
Open:	8.05	Market Cap:	15.03B
Bid:	N/A	P/E (ttm):	7.88
Ask:	N/A	EPS (ttm):	1.03
1y Target Est:	9.20	Div & Yield:	0.40 (4.80%)



[All Business: 2006 Auto Industry Outlook](#)

# Why Study Toyota?

<i>Automaker</i>	<i>Market capitalization</i>	<i>Total revenue</i>	<i>Profit/loss</i>
<b>Toyota</b>	<b>\$166.4</b>	<b>\$179.4</b>	<b>\$10.7</b>
<b>Honda</b>	<b>\$55.4</b>	<b>\$83.7</b>	<b>\$4.5</b>
<b>DaimlerChrysler</b>	<b>\$52.3</b>	<b>\$194.1</b>	<b>\$3.1</b>
<b>Nissan</b>	<b>\$46.7</b>	<b>\$83.4</b>	<b>\$4.7</b>
<b>BMW</b>	<b>\$28.1</b>	<b>\$60.1</b>	<b>\$2.9</b>
<b>Volkswagen</b>	<b>\$21.5</b>	<b>\$122.8</b>	<b>\$1.2</b>
<b>Hyundai</b>	<b>\$20.4</b>	<b>\$51.3</b>	<b>\$1.6</b>
<b>Audi</b>	<b>\$15.2</b>	<b>\$34.3</b>	<b>\$1.1</b>
<b>Ford Motor</b>	<b>\$15.2</b>	<b>\$175.5</b>	<b>\$2.0</b>
<b>General Motors</b>	<b>\$12.7</b>	<b>\$193.0</b>	<b>-\$3.9</b>
<b>Suzuki</b>	<b>\$10.5</b>	<b>\$22.8</b>	<b>\$0.6</b>
<b>Mitsubishi</b>	<b>\$9.9</b>	<b>\$18.9</b>	<b>-\$3.4</b>
<b>Kia</b>	<b>\$8.3</b>	<b>\$17.1</b>	<b>\$0.6</b>
<b>Porsche</b>	<b>\$6.6</b>	<b>\$8.0</b>	<b>\$1.0</b>
<b>Mazda</b>	<b>\$6.2</b>	<b>\$25.1</b>	<b>\$0.5</b>
<b>Isuzu</b>	<b>\$4.8</b>	<b>\$13.8</b>	<b>\$0.5</b>

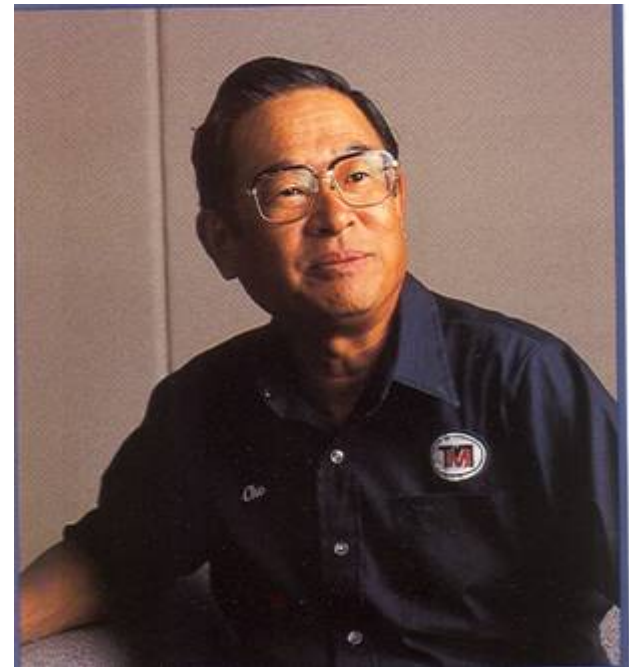
*Revenue, net income are in US billions from the four quarters Q4 '04 through Q3 '05.  
Source: Capital IQ*

# Thought Question again

**Why is Toyota so much more successful than GM?**

- **Technology is almost exactly the same.**
- **Product is essentially the “same”.**
- **Customers are essentially the same.**

## The Toyota Way according to former President Cho



“Toyota contributes to society through the manufacturing of high-quality products and services. Our practices based on this core principle have become a source of competitive advantage. These managerial values and methods are the **Toyota Way.**”

-2001

# Toyota Way is always...

- Simple & Practical
- Consistently solving real business problems
  - at each level of the company
  - in each activity of the company
  - in real time
  - at the root cause

# The Toyota Story

- Toyota picked up where Ford left off with “flow production”.
- Taiichi Ohno followed Ford’s early thinking to its logical conclusion in a high-variety, lower volume environment.
- His solution was high-variety production system with high velocity to shorten time from order to cash – TPS.

# The Toyota Story

Toyoda Family to Taiichi Ohno:

“Catch up with the U.S. auto industry in three years...!”

## “Catch up with the U.S. auto industry in three years...!”

- Market much smaller than the US, yet diverse
- Productivity 1/10 that of the US
- No money, banks refused additional loans
- Poor labor-management relations

# The Toyota Production System

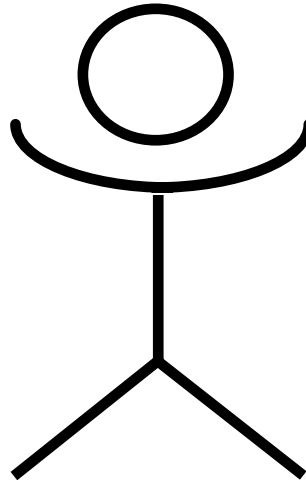
**Best Quality - Lowest Cost - Shortest Lead Time**  
Through Shortening the Production Flow By Eliminating Waste

## Just in Time

“The right part  
at the right time  
in the right amount”

- Continuous Flow
- Pull System
- Takt Time

*HEIJUNKA*



## Jidoka

“Built-in Quality”

- Automatic Machine Stop
- Fixed Position Line Stop
- Error Proofing
- Visual Control
- Labor-Machine Efficiency

*Production Lines  
That Stop for  
Abnormalities*

## Standardized Work and Kaizen

Mutual Trust; Employee Development  
Stability; TPM; 5S

Robust Products and Processes  
Supplier Involvement

# The NUMMI Example: Lean Success with a UAW Workforce

Agreement between Toyota and GM:

Toyota manages the plant and  
implements the Toyota Production System

GM's "worst" plant:

Quality  
Workforce

Former GM workers offered jobs:

Including the old "troublemakers"

# The NUMMI Example: Lean Success with a UAW Workforce

## Extensive training program:

Over 600 employees sent to Japan for training

Over 400 trainers sent from Japan to NUMMI

About 30 managers or "coordinators" from Japan

## TPS established:

Physicals

Product, plant layout, etc.

Management/people systems

# The NUMMI Example: Lean Success with a UAW Workforce

## Results

In about one year...

*Quality*      Equal to Takaoka Japan  
*Productivity*      Close to Takaoka Japan

# The Toyota Production System

**Best Quality - Lowest Cost - Shortest Lead Time**  
through Shortening the Production Flow By Eliminating W

Quantity  
or "Flow"  
Control

Quality  
Control

Quality, Quantity,  
then Cost

## Just in Time

"The right part  
at the right time  
in the right amount"

- Continuous Flow
- Pull System
- Takt Time

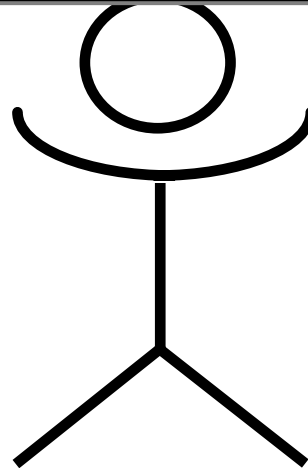
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## Jidoka

"Built-in Quality"

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*Production Lines  
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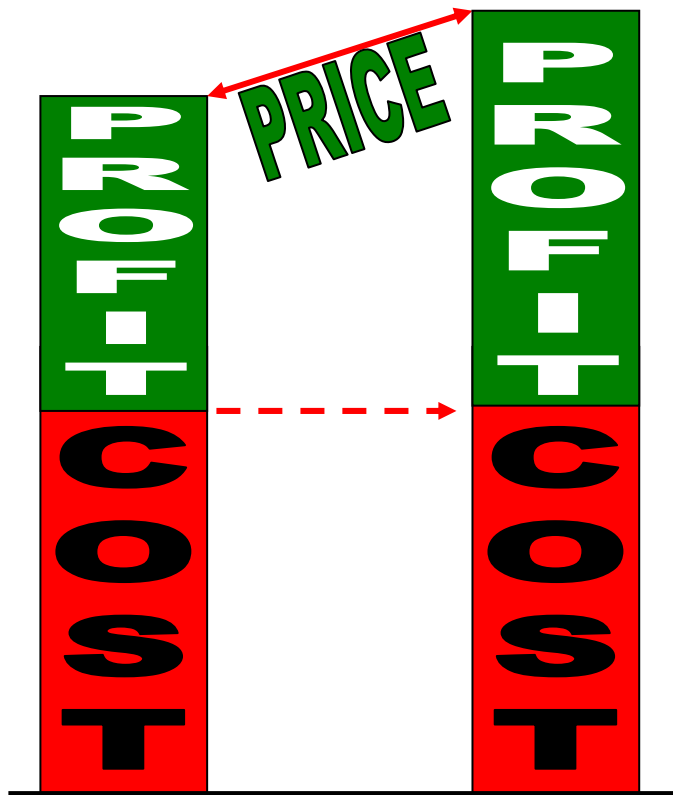


## Standardized Work and Kaizen

Mutual Trust; Employee Development  
Stability; TPM; 5S

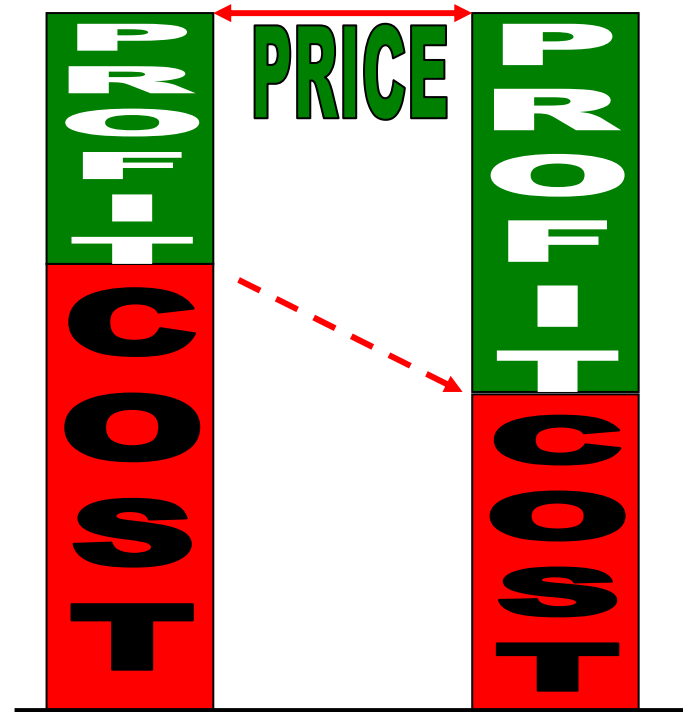
Robust Products and Processes  
Supplier Involvement

# Cost Cutting Vs. Systematic Total Cost Reduction



Conventional Thinking

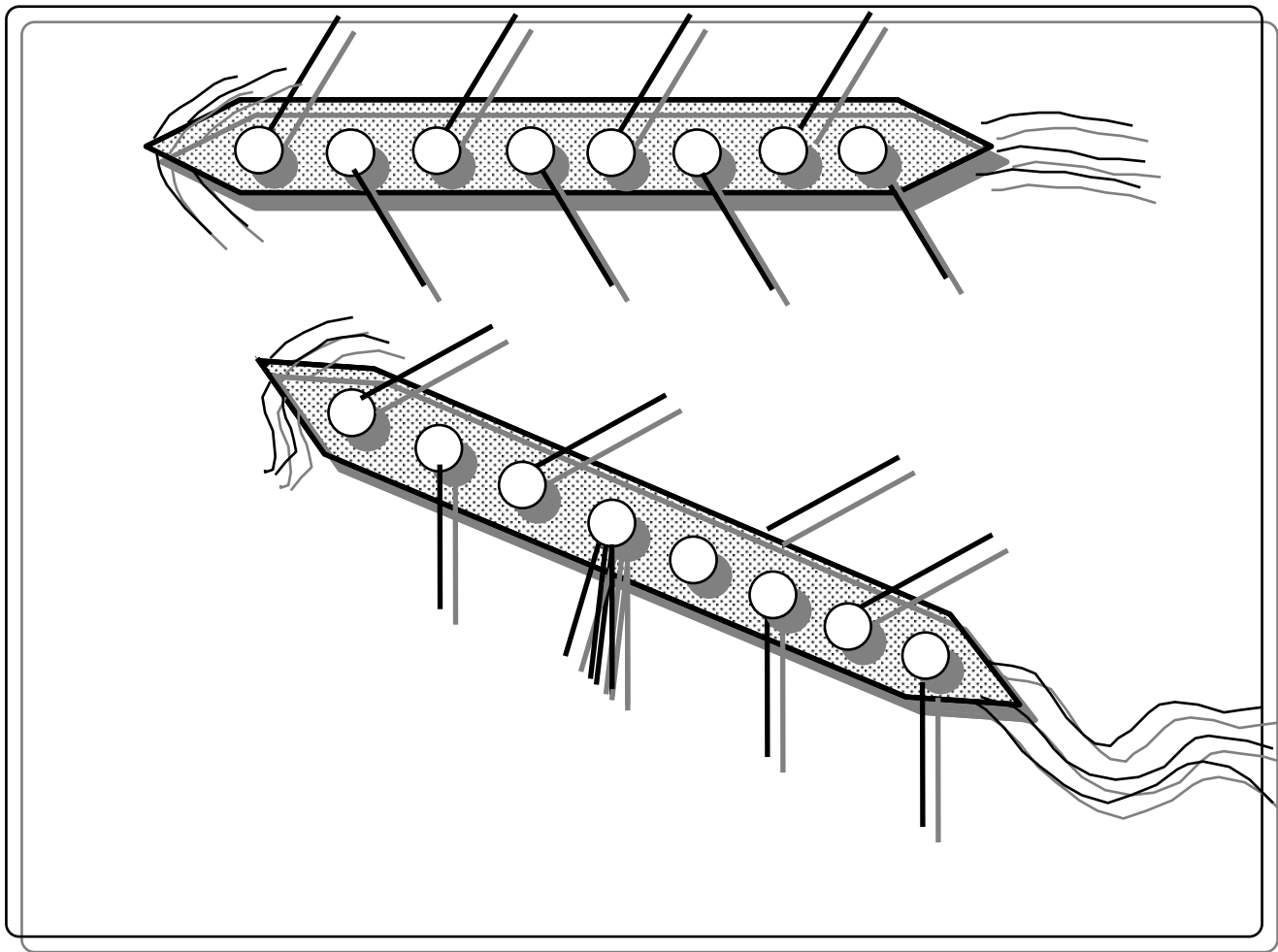
$$\text{Cost} + \text{Profit} = \text{Price}$$



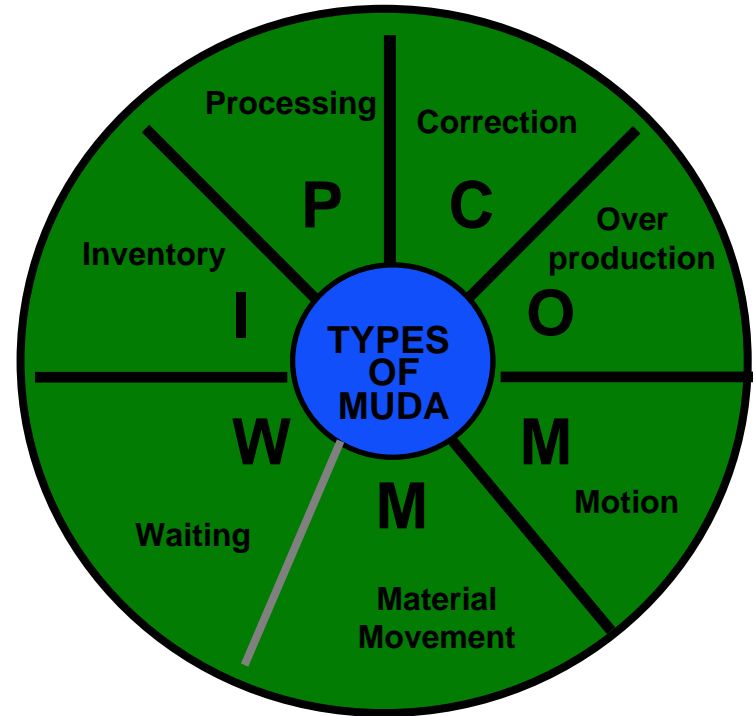
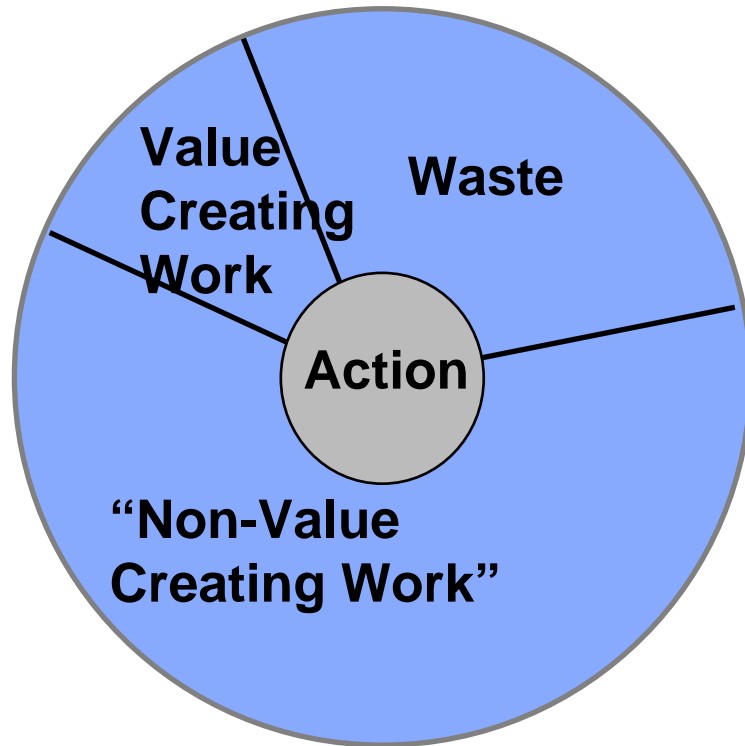
Lean Thinking

$$\text{Profit} = \text{Price} - \text{Cost}$$

# Individual Efficiency vs. System Efficiency



# WASTE



# System Design to Control the 3 M's

- Muri – Overburden or unreasonableness to a person or a machine

Too much overtime!  
Stress!  
Not enough resources!

- Mura – Instability; Unevenness; Variation

- Muda – Waste

The Seven  
Types of Waste

- End of month deadlines with much overtime followed by periods of not enough work!  
- All projects scheduled in 1Q with none in 2Q!  
- Extensive IT everywhere yet not enough copy machines!

# The Toyota Production System

**Best Quality - Lowest Cost - Shortest Lead Time**  
Through Shortening the Production Flow By Eliminating Waste

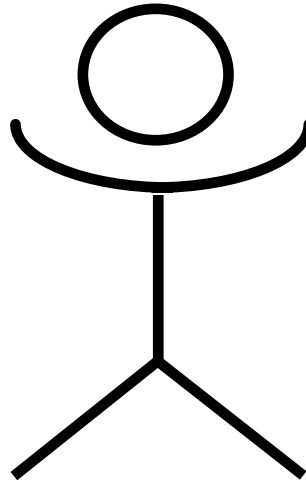
Quality Control

## Just in Time

“The right part  
at the right time  
in the right amount”

- Continuous Flow
- Pull System
- Takt Time

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## Jidoka

“Built-in Quality”

- Automatic Machine Stop
- Fixed Position Line Stop
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- Labor-Machine Efficiency

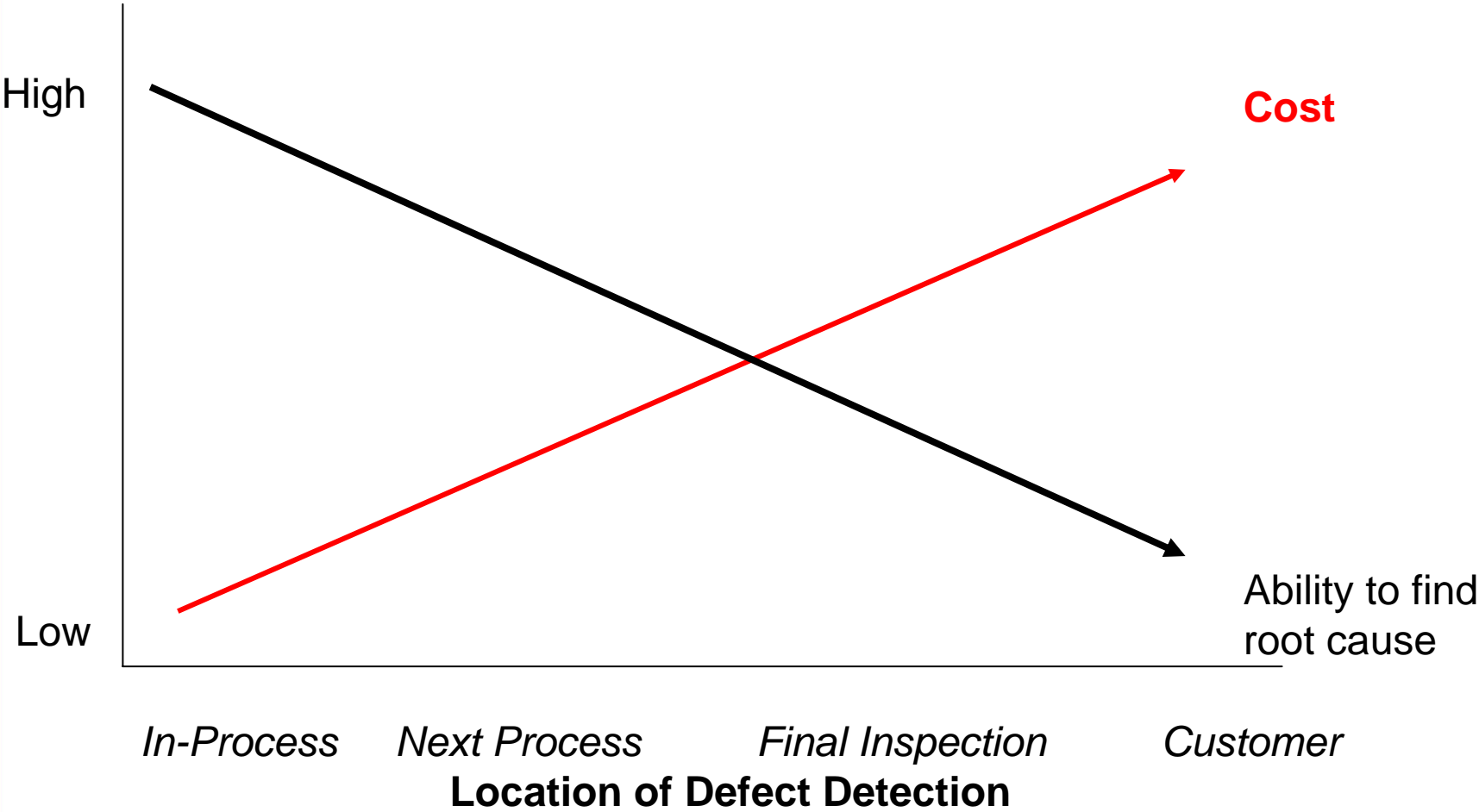
*Production Lines  
That Stop for  
Abnormalities*

## Standardized Work and Kaizen

Mutual Trust; Employee Development  
Stability; TPM; 5S

Robust Products and Processes  
Supplier Involvement

# Quality At The Source

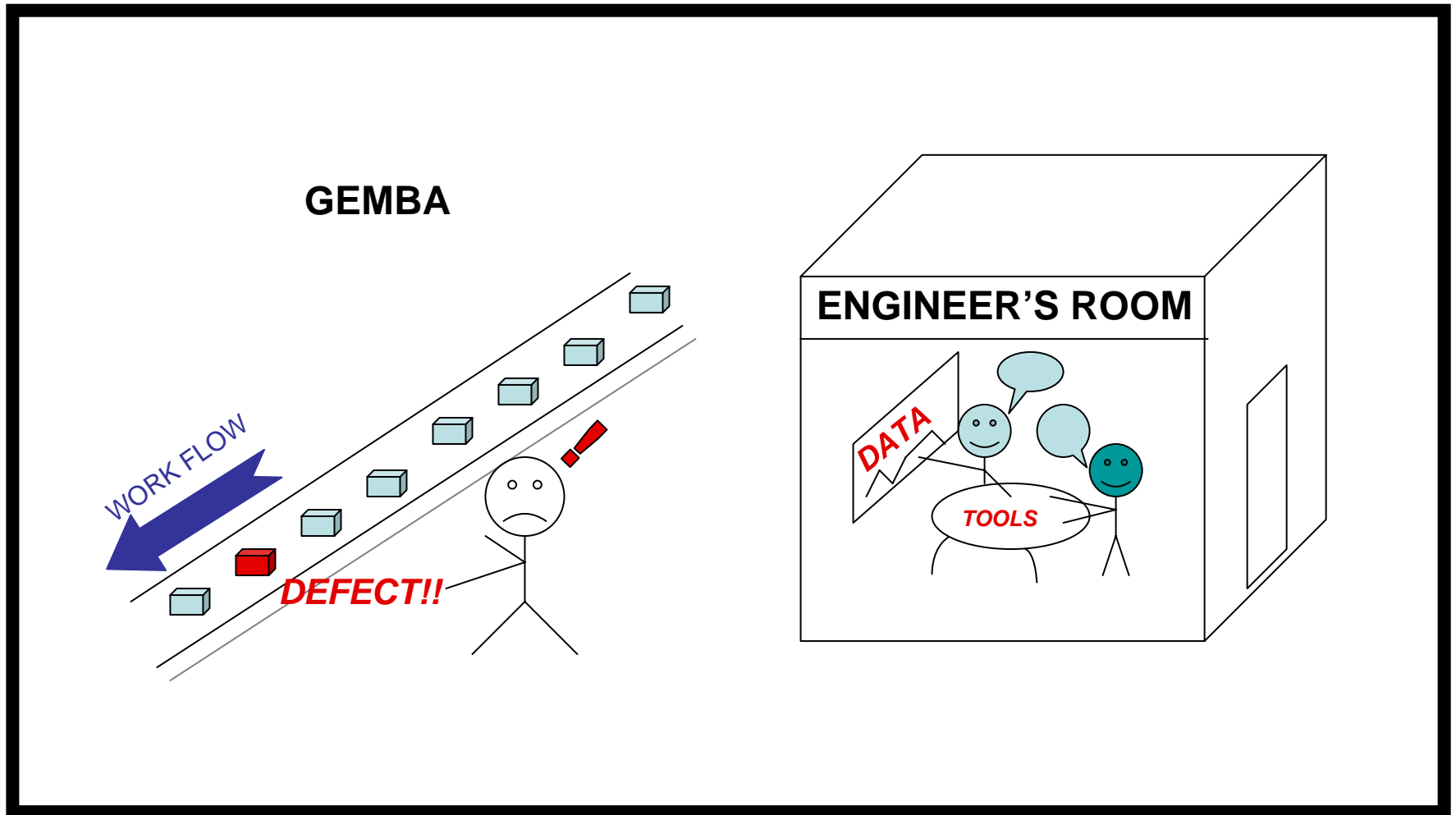


## Core Toyota View:

- “You can understand everything about a company that is important by observing from a good spot on the plant floor.”

# Lean Problem Solving

- at the gemba
- five whys



# The Toyota Production System

“Quantity Control” or Flow Pillar

**Best Quality - Lowest Cost - Shortest Lead Time**

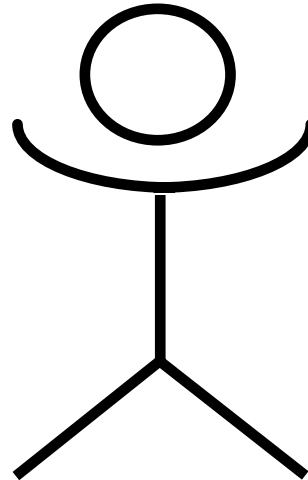
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*Production Lines That Stop for Abnormalities*

## Standardized Work and Kaizen

Mutual Trust; Employee Development  
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Robust Products and Processes  
Supplier Involvement

# The Toyota Story

**“I plan to cut down on the slack time within processes and in the shipping of parts and material as much as possible. I call the basic principle of this the “just in time” approach. The guiding rule is to not ship any goods too early or too late.”**

-Kiichiro Toyoda, 1938

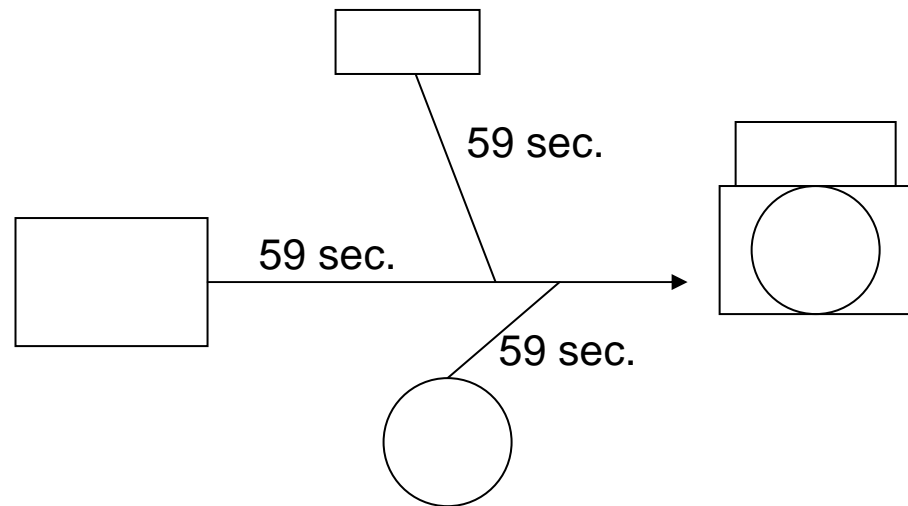
## Takt Time --

### Sets Pace of Production to Match Pace of Sales

Time to produce a single component or entire product, based on sales.

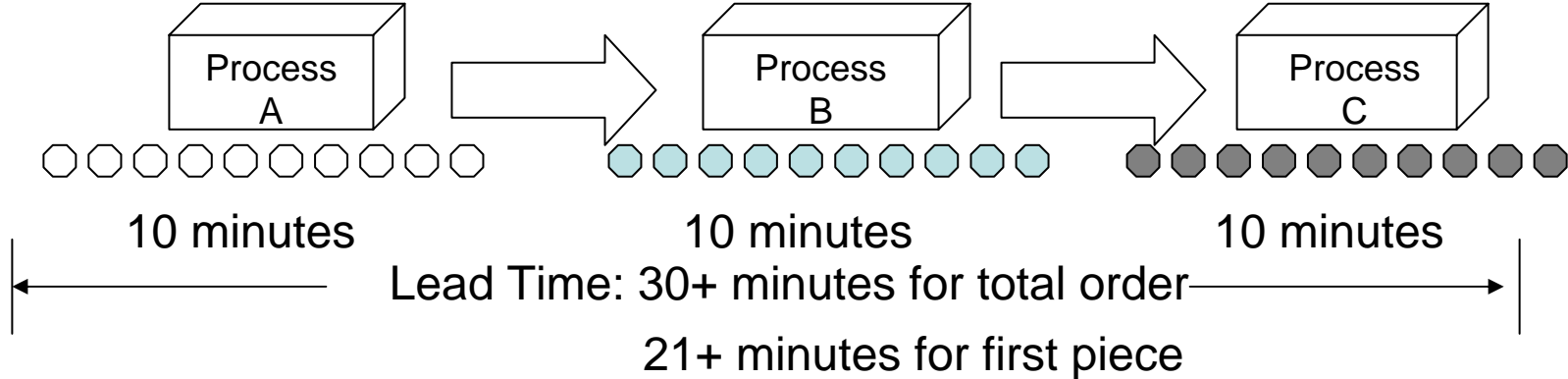
$$\text{Takt Time} = \frac{\text{Operating Time per Shift}}{\text{Production Requirement per Shift}}$$

$$\frac{450 \text{ minutes}}{460 \text{ pieces}} = 59 \text{ sec}$$

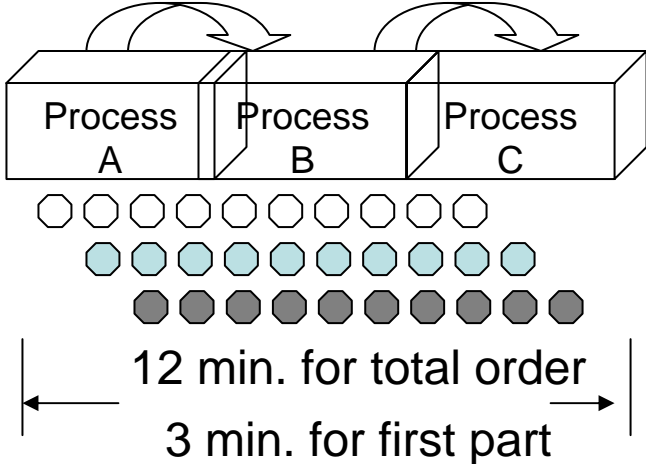


# Continuous Flow Processing

## Batch Processing



## Continuous Flow Processing



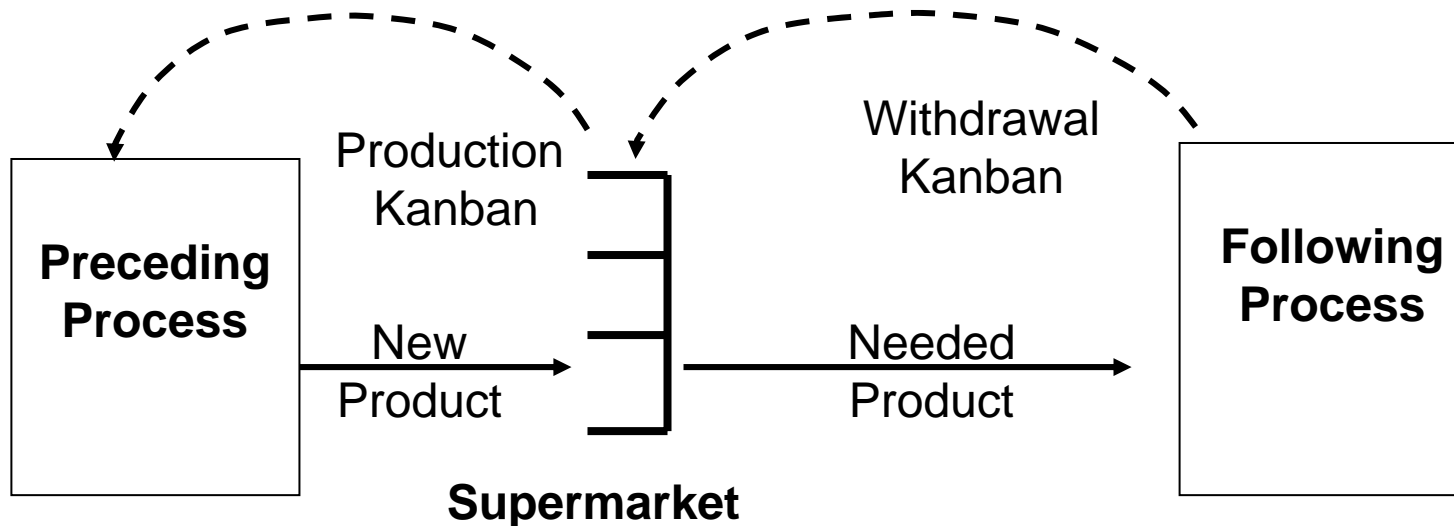
## Pull System

### Assumptions:

- *Production schedules will always change*
- *Production will never go according to schedule*

### Rules:

- Following processes go to preceding processes and withdraw what they need when they take it.
- Preceding processes replenish what is taken away.



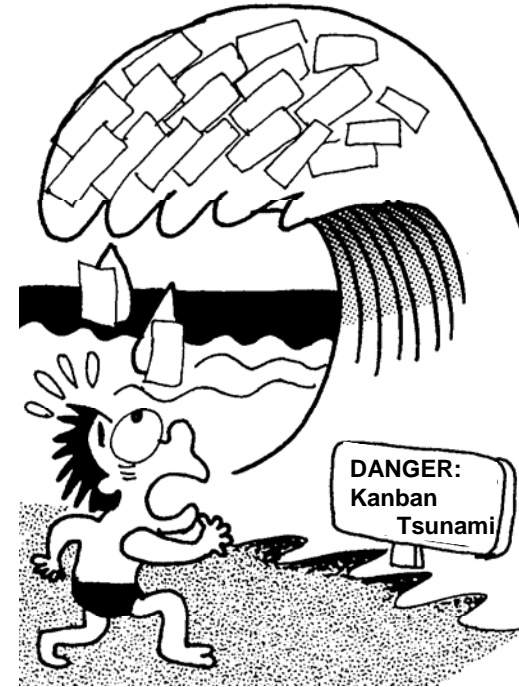
# Level the volume and mix of work

## Every Part Every Week

Monday	400A
Tuesday	100A, 300B
Wednesday	200B, 200C
Thursday	400C
Friday	200C, 200A

## Every Part Every Day

Monday:  
140 A, 100 B, 160 C



Monday →

## Every Part Every X (EPEX)

20 A	10 C	20 A	10 C	20 A	10 C	20 B	10 A
20B	20 A	20 B	20 A	20 B	20 A	20 C	20 B
10 C	20 C	10 C	20 C	10 C	20 C	10 A	20 C

How do you want to run your operations?

# The Toyota Production System

**Best Quality - Lowest Cost - Shortest Lead Time**  
Through Shortening the Production Flow By Eliminating Waste

## Just in Time

“The right part  
at the right time  
in the right amount”

•Continuous Flow

Foundation of  
operational stability  
and improvement

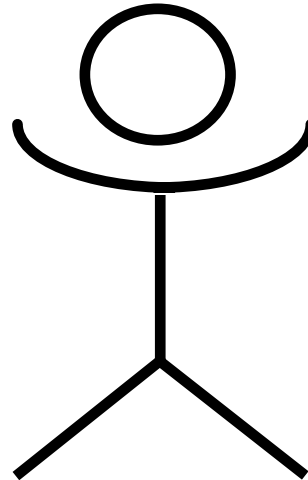
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## Jidoka

“Built-in Quality”

- Automatic Machine Stop
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*Production Lines  
That Stop for  
Abnormalities*



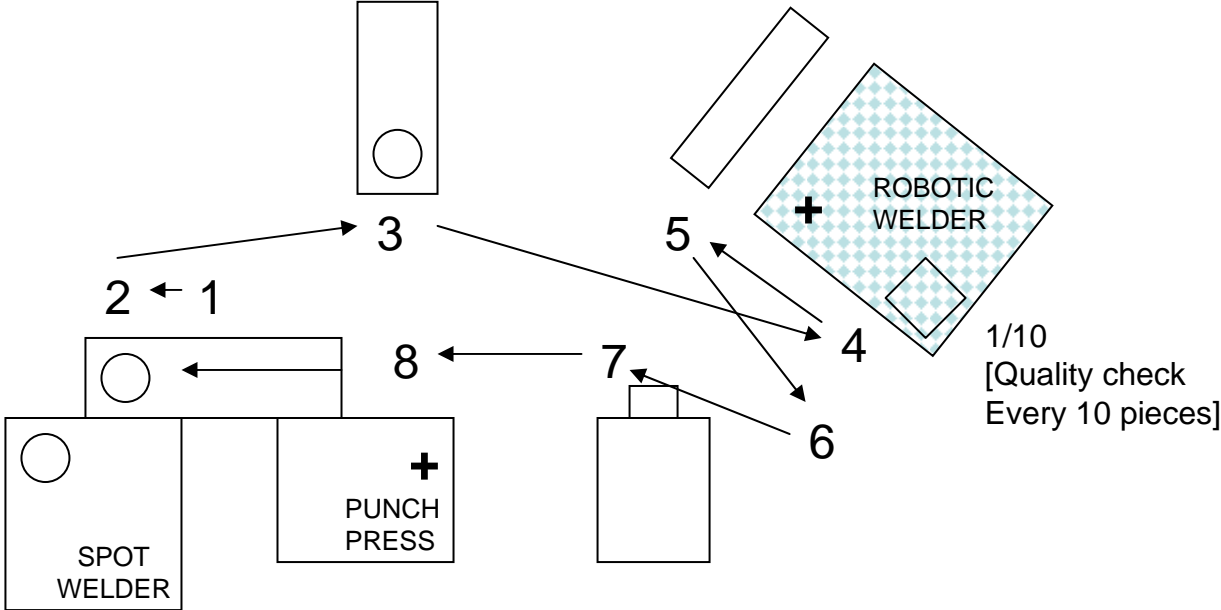
## Standardized Work and Kaizen

Mutual Trust; Employee Development  
Stability; TPM; 5S

Robust Products and Processes  
Supplier Involvement

# Standardized Work Chart

Standardized Work Chart	From: Pick up bar To: Set RP in press	Analysis Number 1 / 3	5-15-95 AX	Leader: Coach:
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Takt Time	Std. In-Proc Inventory	Cycle Time	In-Process Inventory	Quality Checkpoint	Safety Precaution
56	3	54	○	◇	+

# Standardized Work as Structured Learning for the Operator

What is Standardized Work? What is Kaizen?

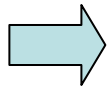
They are two sides of the same coin – if you try to have one without the other, you will encounter one of two types of very serious problems:

1. *Standardized Work without Kaizen;*
2. *Kaizen without Standardized Work.*

# Standardized Work as Structured Learning for the Operator

## 1. Standardized Work without Kaizen

- Employee motivation killed, human creativity wasted
- Problems repeat, unidentified and unsolved
- Employees don't take initiative, improvement stops

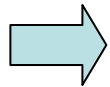


Operations – like economies, like companies, like cultures, like species – either progress or decline

# Standardized Work as Structured Learning for the Operator

## 2. *Kaizen* without Standardized Work

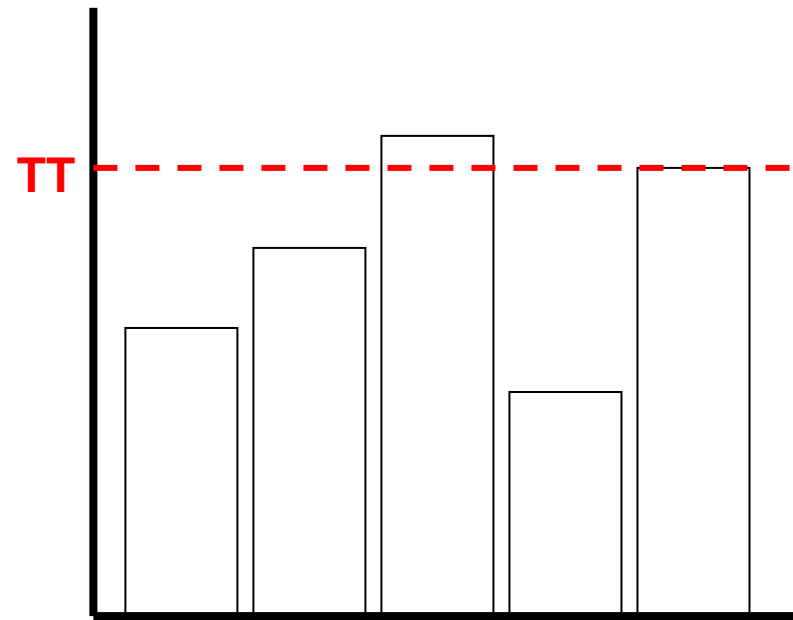
- Chaotic change, saw-tooth effect
- Problems repeat, PDCA not followed, no root cause analysis
- Progress impossible to identify, Improvement stops



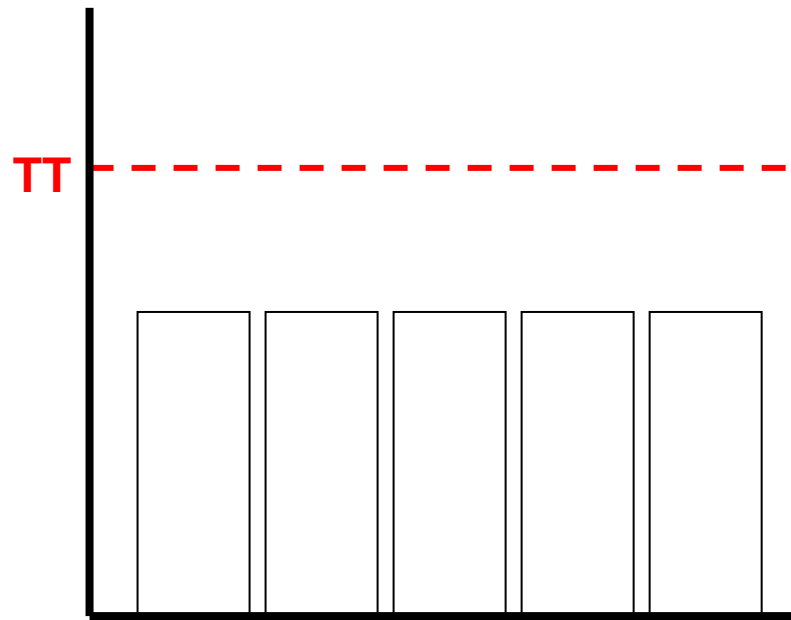
**Kaizen – like the Scientific Method – requires a baseline of comparison**

# SW and Operator Balance

Traditional Approach: Balance all the existing operators



BEFORE

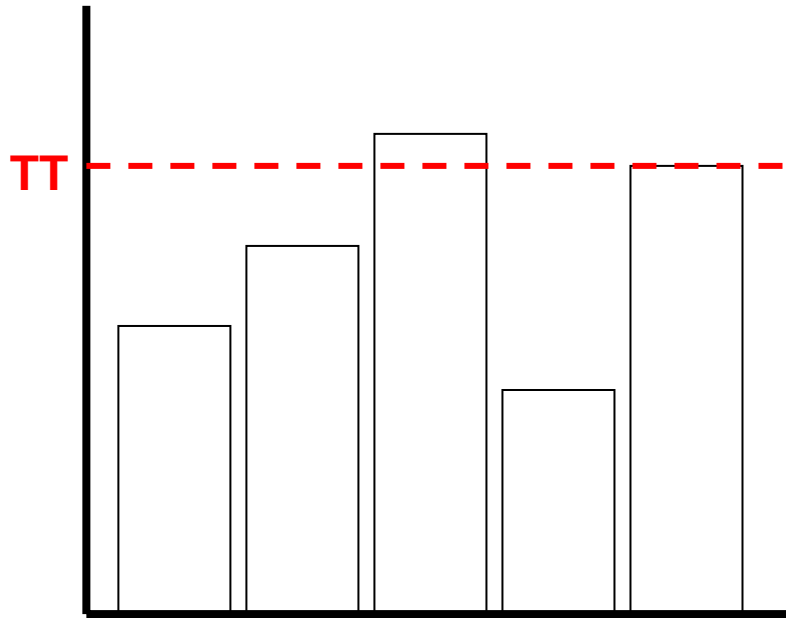


AFTER

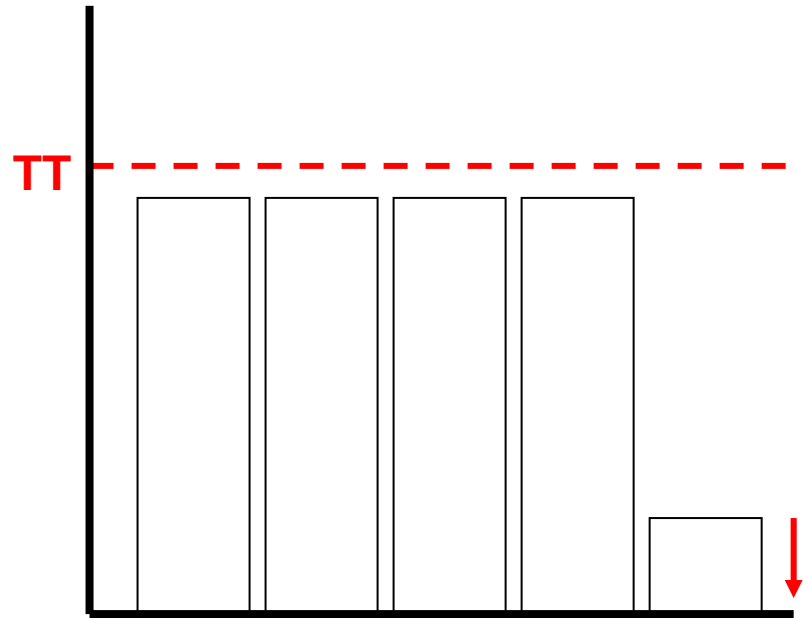
# SW and Operator Balance

Lean Approach: Balance each c/t to TT

Strive to eliminate one job

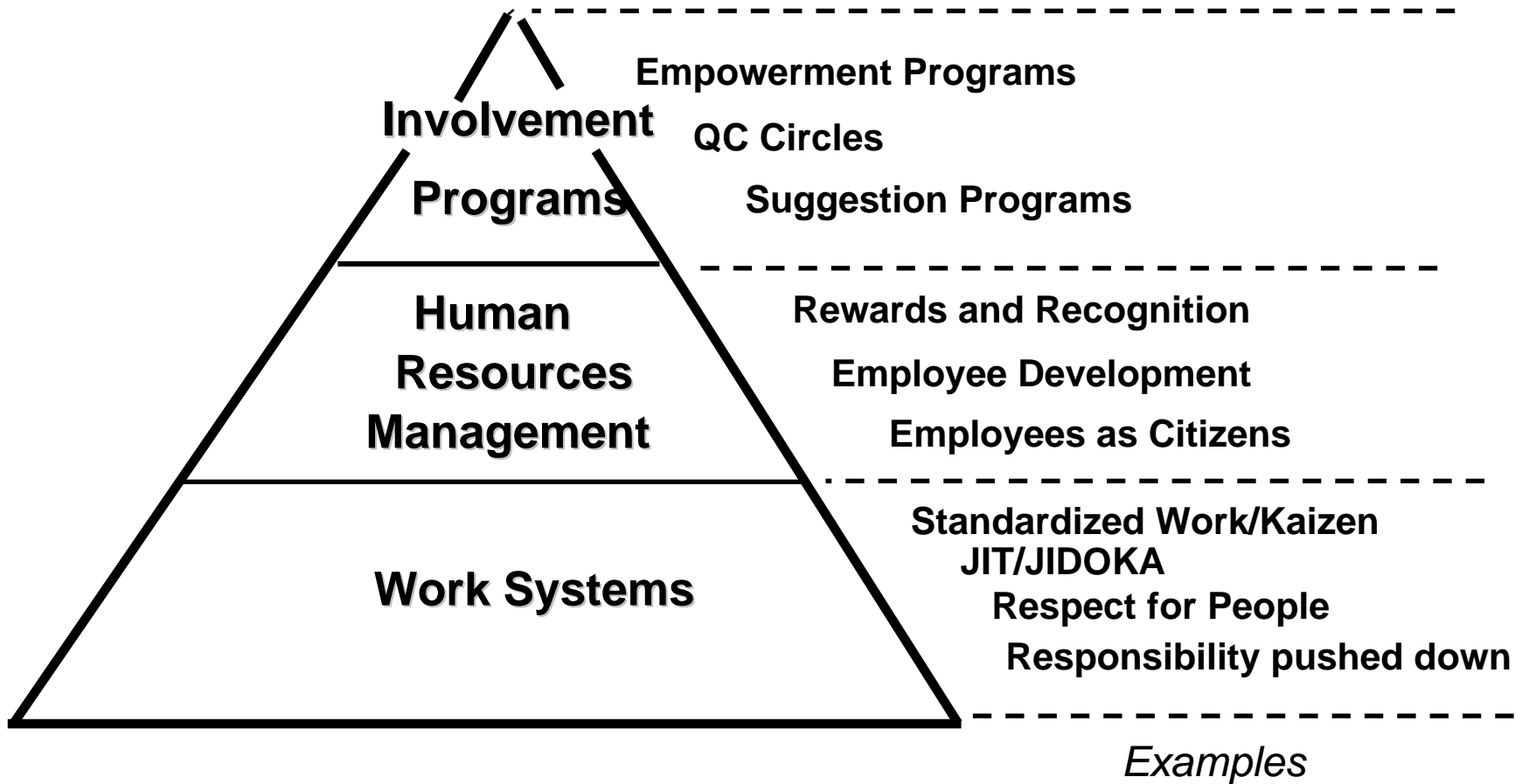


BEFORE



AFTER

# People Systems for the Lean Enterprise



## Toyota's Cheryl Jones...

**“Continuous improvement comes from making mistakes and learning from them.”**

## From “LEAN” to “LEARN”

- Arguably what Toyota accomplished in its early days that has enabled it to continue to thrive is simply that it learned to learn.

# Thinking Production System

“If some problem occurs in one-piece-flow manufacturing then the whole production line stops. In this sense it is a very bad system of manufacturing. But when production stops everyone is forced to solve the problem immediately. So team members have to think, and through thinking team members grow and become better team members and people.”

-Teruyuki Minoura, former President,  
Toyota Motor Manufacturing, North America

# The Thinking Production System

**Best Quality - Lowest Cost - Short**  
Through Shortening the Production Flow By

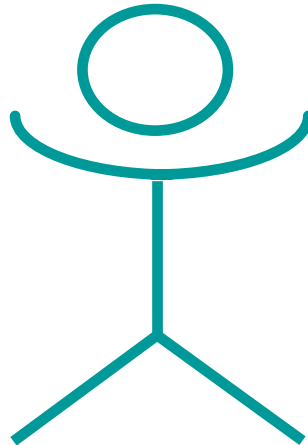
Getting people  
to think and  
take initiative  
is the key!

## Just in Time

“The right part  
at the right time  
in the right amount”

- Continuous Flow
- Pull System
- Takt Time

*Leveled Production*



- A
- Fixed Position Line Stop
- Error Proofing
- Visual Control
- Labor-Machine Efficiency

*Production Lines  
That Stop for  
Abnormalities*

## Operational Stability and Kaizen

Standardized Work  
Preventative Maintenance; 4S

Robust Products and Processes  
Supplier Involvement

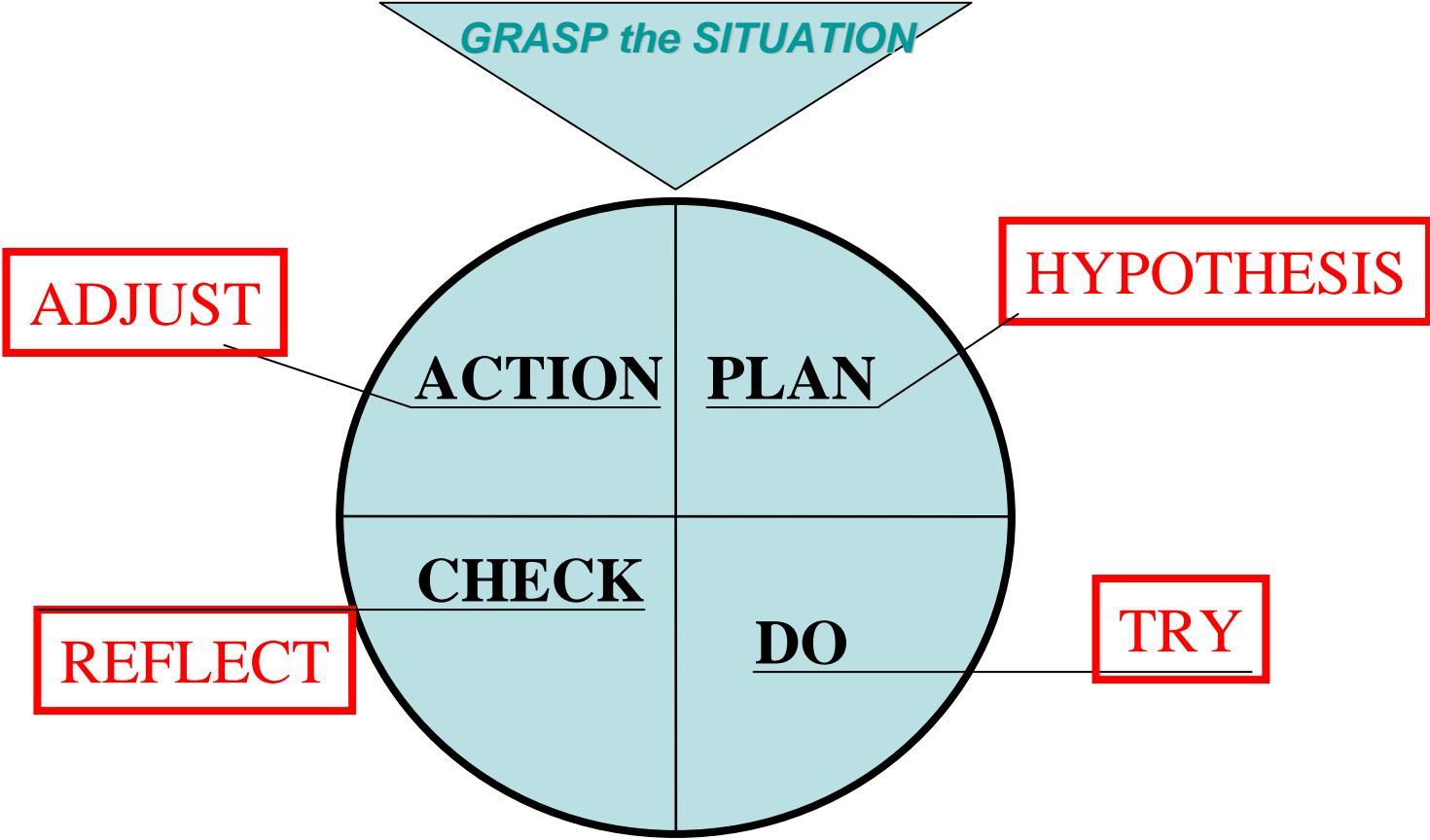
# Teach the Scientific Method

from “*scientific management*”  
to “*management by science*”

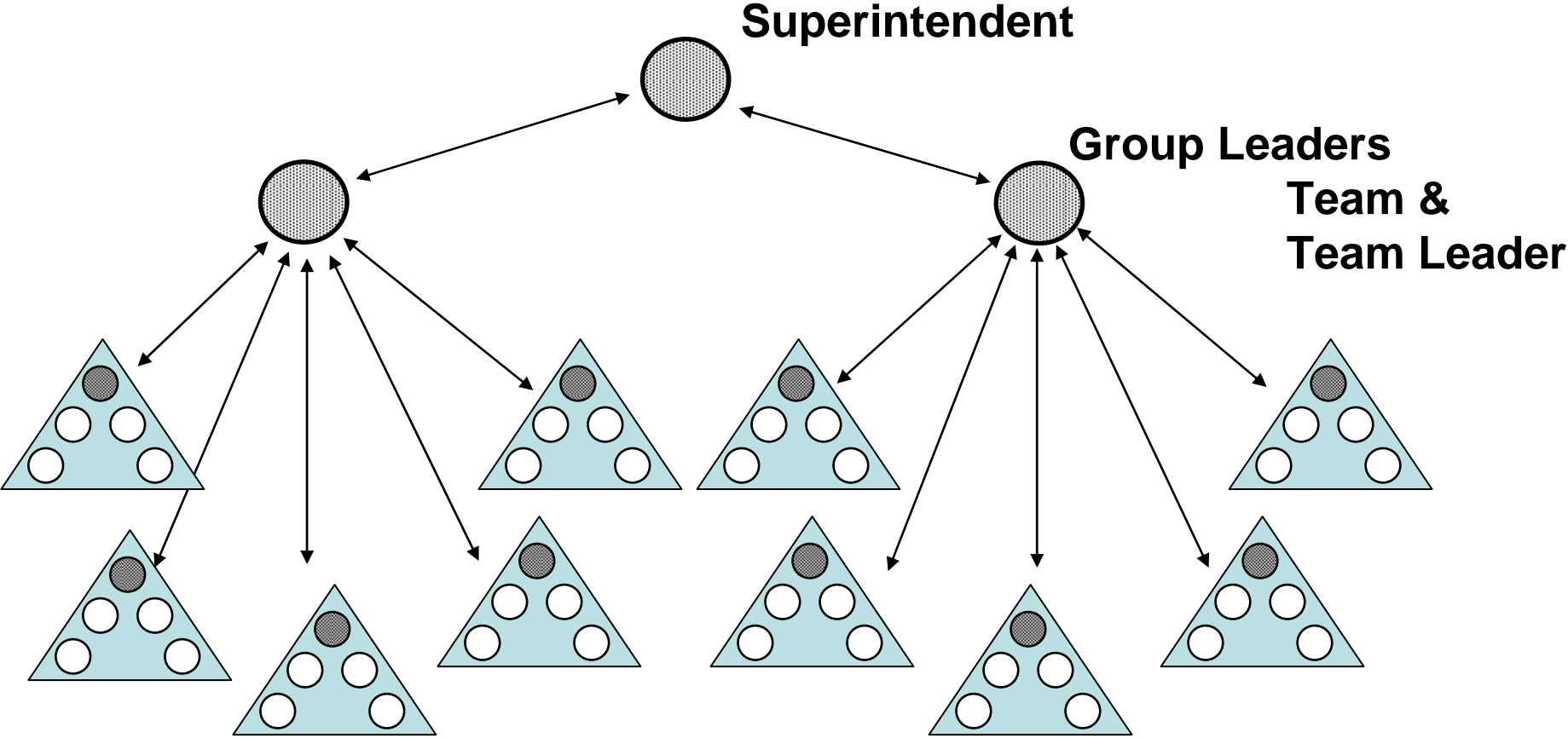
**Each leader’s job is to develop his/her people:**

- What is the real problem? What is the root cause? Use the “Five Why” process.
- “Countermeasures” and “solutions”.
- PDCA, Kaizen, Continuous Improvement, -- all are essentially the *scientific method*.

# P-D-C-A Cycle



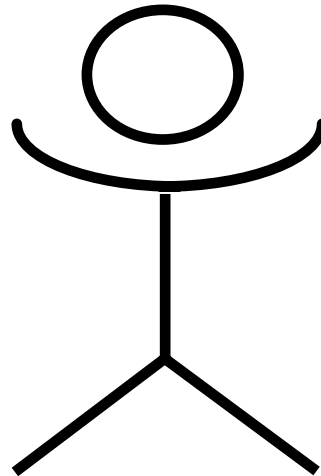
# Extensive Support and Coaching at the Front Lines of the Organization



# The Toyota Way

**Best Quality - Lowest Cost - Shortest Lead Time**  
**Best Safety - Highest Morale**

**Continuous  
Improvement**



**Respect  
for  
People**

**PDCA Learning Cycles**

# Respect for People

## Focus on the operator

- Enable the operator
  - To work safely
  - To know his/her customer
  - To be involved, engaged
  - To be successful
  
- *Operator-out* or the *Line-back* principle
  - You can build your operating system from the operator out. Continually remove wasteful steps from his work, giving it to support people (isolate the waste), so that nothing is left but value-creating steps. Don't waste the operator's time and effort!

# Back to the Thought Question

**Why is Toyota so much more successful than GM?**

- **Technology is almost exactly the same.**
- **Product is essentially the “same”.**
- **Customers are essentially the same.**

# NUMMI as a Macro Learning Example:

## The Business Agreement:

Toyota manages the plant and implements the Toyota Production System

## The Business Case for GM

Small profitable car

TPS

Idle capacity – plant and people

## The Business Case for Toyota:

??

Results:      GM      ??

                 Toyota      ??

# President Cho of Toyota: Three Keys to Leadership the Toyota Way



## Go See.

- **“Sr. Mgmt. must spend time on the plant floor.”**

## Ask Why.

- **“Use the “Why?” technique daily.”**

## Show Respect.

- **“Respect your people.”**