



Production Management in Japan



Class 5



KEIO 150
Design the Future

Quotes of the Day



“Observe the production floor without preconception and with a blank mind. Repeat “why“ five times to every matter.”

Taiichi Ohno (in Jeffrey Liker`s “The Toyota Way“)

“Mr. Ohno used to say that no problem discovered when stopping the line should wait longer than tomorrow morning to be fixed. Because when making a car every minute we know we will have the same problem tomorrow.”

Fujio Cho, President, Toyota Motor Corporations

This Lecture



- Japan as the world leader in production management
- JIT
- Kanban
- Total Quality Management
- The Toyota Case

Japan is the World Leader in Production



- After World War II
- The most important concept here is the Toyota Way

Toyota Production System



Technical

- Stability
- JIT
- Jidoka
- Kaizen
- Heijunka

People

Long-term assets –
Learned Skills
Machinery depreciates –
Loses Value
People appreciate – Continue to grow

Management

- Tools to focus Management attention
- Go and See
- Problem-solving
- Presentation Skills
- Project management
- Supportive culture

Philosophy/Basic Thinking

- Customer first
- People are most important asset
 - Kaizen
- Go and see => Focus on floor (Feedback to Team Members)
 - Efficiency Thinking
 - True (vs. Apparent) condition
- Total (vs. Individual) team involvement

4P Model of the Toyota Way (Liker)

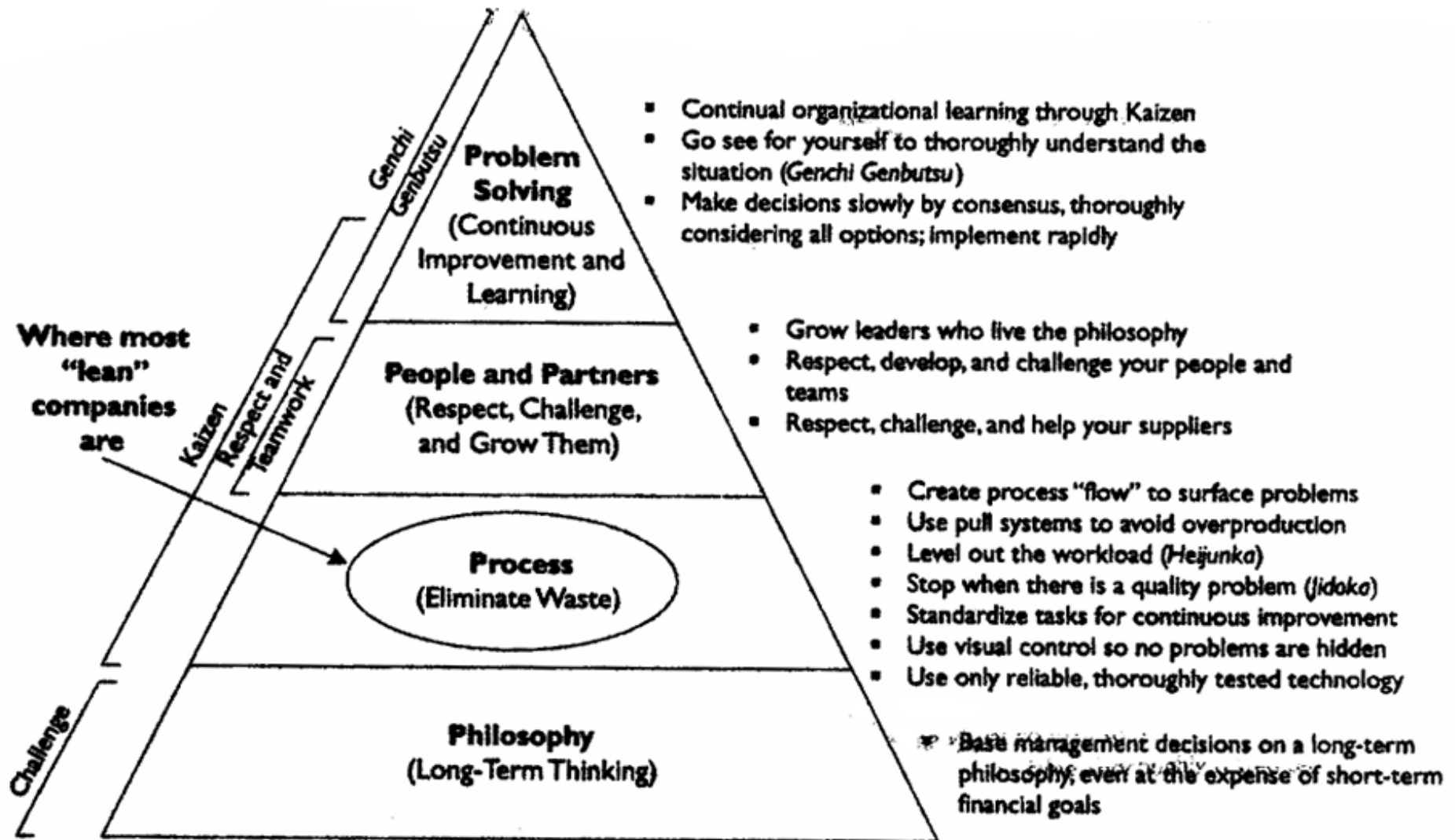


Figure I-2. The "4 P" model and where most companies are

The Three M's



- The Toyota Way refers to the “elimination of waste”
- Waste
 - Muda - non-value-added
 - Muri - overburdening people or equipment
 - Mura - unevenness

8 Types of *muda*



- Overproduction
- Waiting (time on hand)
- Unnecessary transport or conveyance
- Overprocessing or incorrect processing
- Excess inventory
- Unnecessary movement
- Defects
- Unused employee creativity (Liker: The Toyota Way, p. 29)

Muri



- Muri – overburdening of people or equipment
 - This is in some respects on the opposite end of the spectrum of muda. Muri is pushing a machine or person beyond natural limits. Overburdening people results in safety and quality problems. Overburdening equipment causes breakdowns and defects

Mura



- Mura – Unevenness
 - Resolution of the other two M's
 - In normal production systems, at times there is more work than the people and machines can handle and at other times there is a lack of work
 - Unevenness results form an irregular production schedule or fluctuating production volumes due to internal problems, like missing parts. Muda will be a result of mura

Heijunka – Leveling Production and Schedules



- Heijunka is the leveling of production by both volume and product mix.
- It does not build products according to the actual flow, but it takes the total volume of orders in a period and level them out so the same amount and mix are being made each day.

The Unleveled Schedule

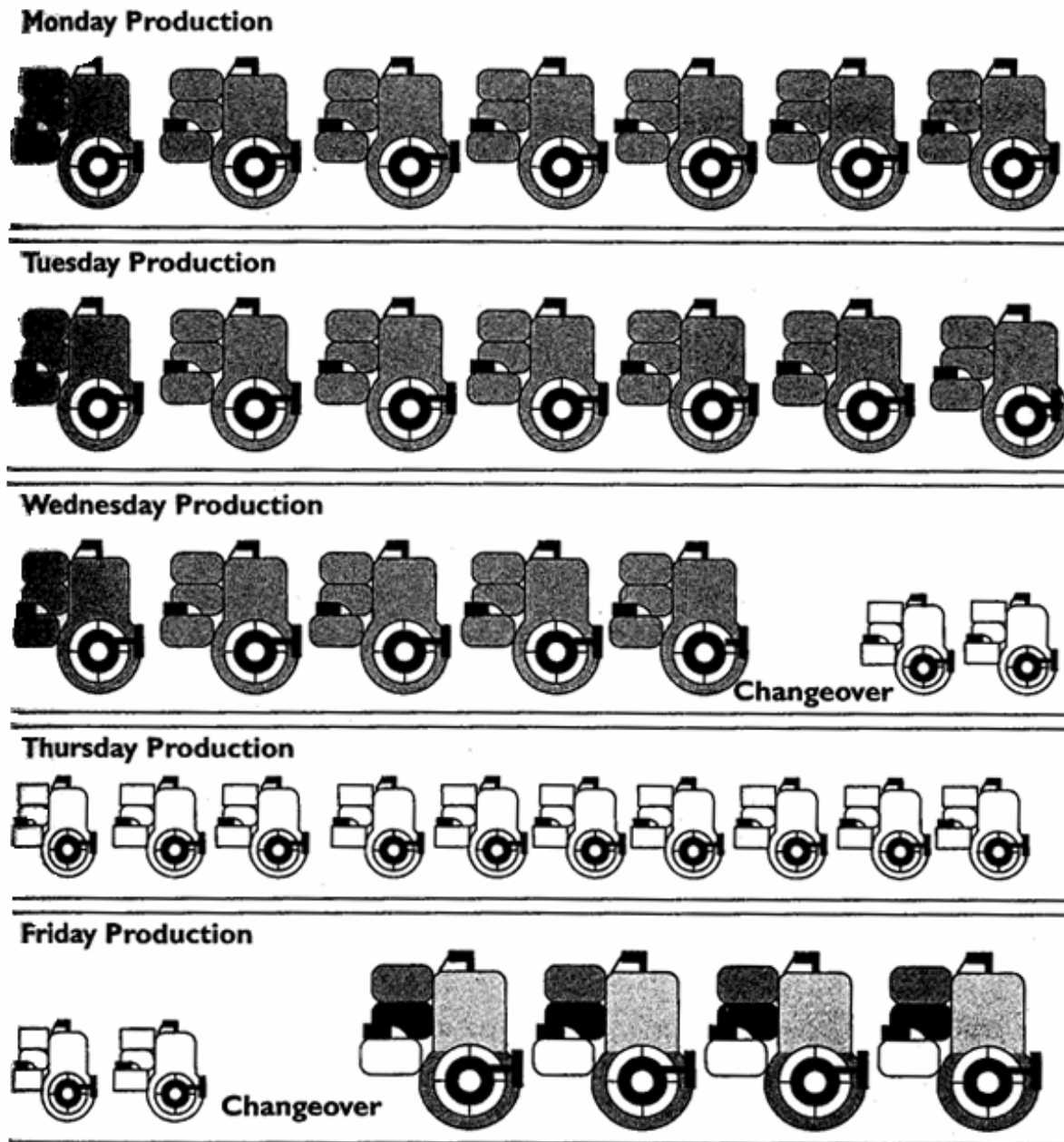


Figure 10-2. Traditional production (unleveled)

The Unleveled Schedule



1. Customers do not buy products predictably
2. There is a risk of unsold goods
3. The use of resources is unbalanced
4. Placing an uneven demand on upstream processes (Liker: The Toyota Way, p. 116)

The Leveled Schedule

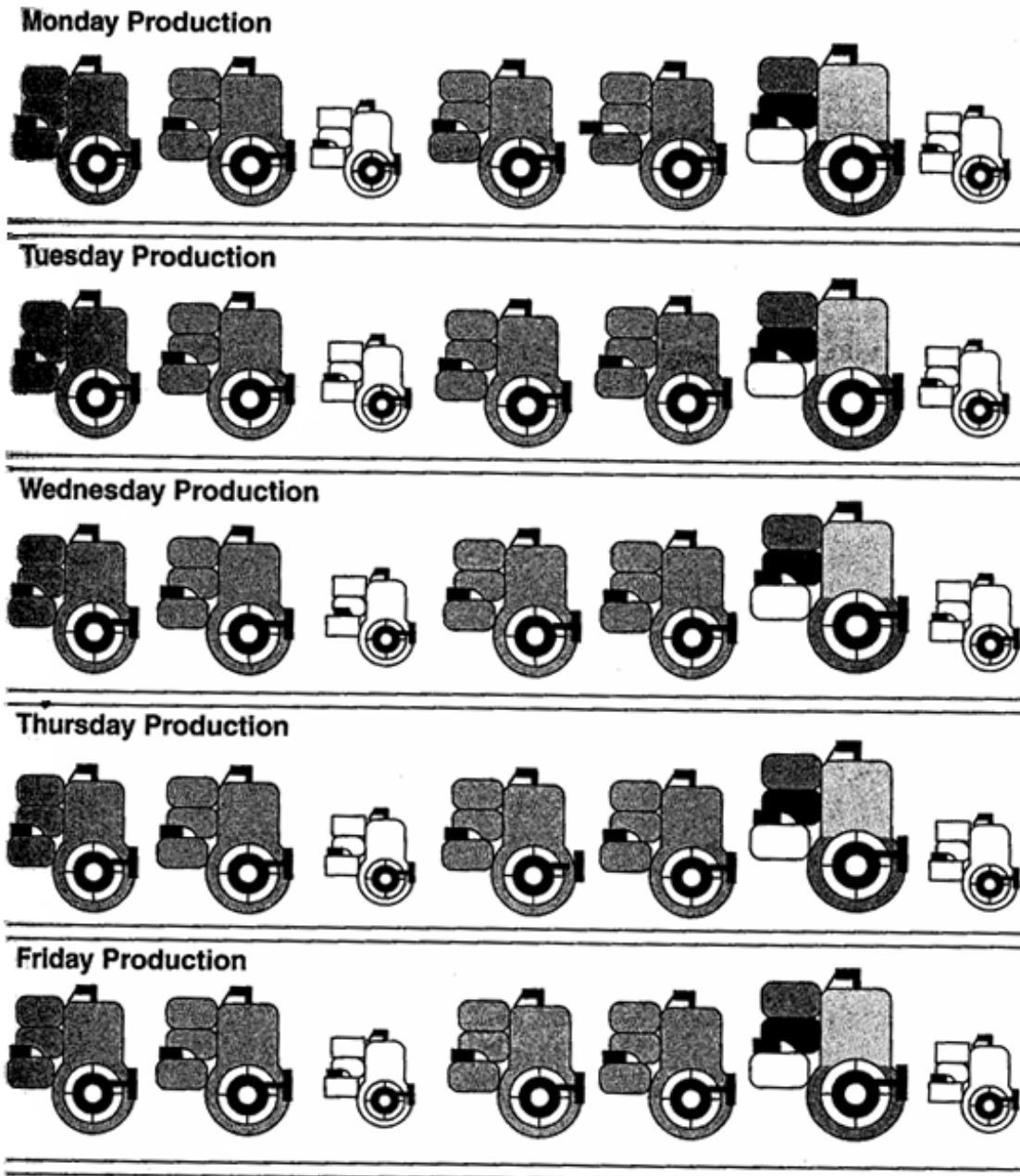


Figure 10-3. Mixed model production (leveled)

Leveling the Schedule



1. Flexibility to make what the customer wants when they want it
2. Reduced risk of unsold goods
3. Balanced use of labor and machine
4. Smoothed demand on upstream processes and the plant's suppliers
(Liker: The Toyota Way, p. 118)

Pull and Push Systems



- Pull systems initiate production as a reaction to present demand
 - The customer`s purchase triggers the pull of materials through the system
 - The customer initiates a chain of demand
- Push systems initiate production in anticipation of future demand
 - The supplier provides materials to where he or she expects them to be needed

Kanban



- At Toyota every step of the manufacturing process has a „kanban“ built in to signal to the previous step that its parts needed to be replenished
- Materials, parts and components are produced and delivered just before they are needed. Each carry a small kanban describing the parts` origin, destination, identity and quantity required



Kanban



- This creates a “pull” which continues cascading backwards to the beginning of the manufacturing cycle
- The most obvious characteristic of the factory with a kanban system is its low inventory
- Consequently, suppliers are being asked to deliver more frequently
- This pull system is the basis of JIT and Jidoka

JIT (Just-in-Time)



- JIT is a set of principles, tools, and techniques that allows a company to produce and deliver products in small quantities, with short lead times to meet specific customer needs
- JIT delivers the right items at the right time in the right amounts
- JIT allows responsiveness to the the day-by-day shifts in customer demand

Some Drawbacks of the JIT System



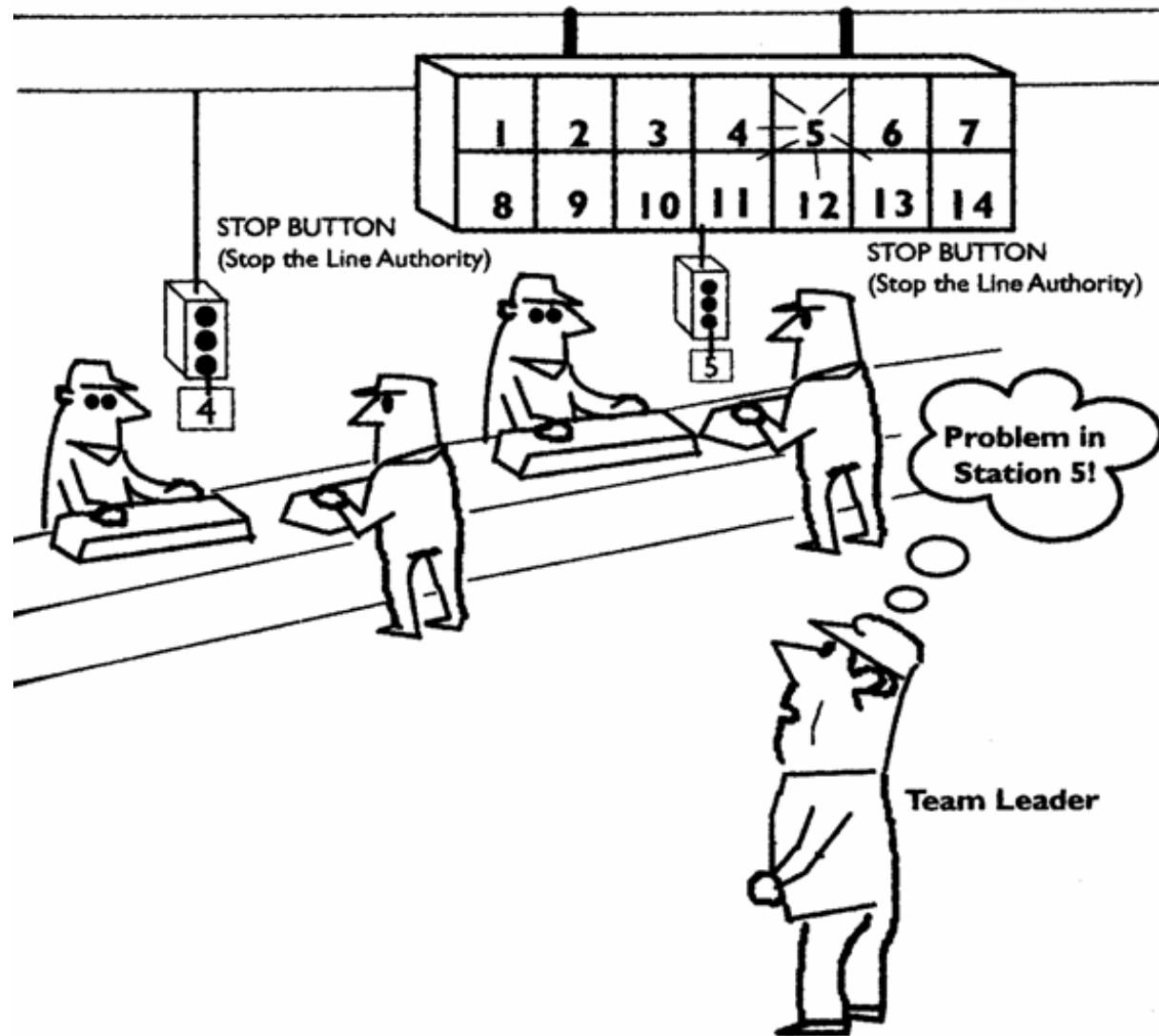
- The key elements of the JIT system are small batch sizes, reduced material handling, level scheduling, low inventory and production control for kanban cards
- They all work for parent plants favorably, but subcontracting companies and plants suffer a great deal
- Frequent deliveries, time constraints, and frequent model and specification changes pressure them

Jidoka (Built in Quality)



- Jidoka can be referred to as automation – equipment endowed with human intelligence to stop itself when it has a problem
- In-station quality (preventing problems from being passed down the line) is much more effective and less costly than inspecting and repairing quality problems after that fact

The *andon* System





“In the case of machines, we build devices into them which detect abnormalities and automatically stop the machine upon such an occurrence. In the case of humans, we give them the power to push buttons or pull cords – called “andon cords” – which can bring our entire assembly line to a halt. Every team member has the responsibility to stop the line every time they see something that is out of standard. That`s how we put the responsibility – they feel the power. They know they count“

Alex Warren, Former Executive Vice President, Toyota Corporation, Kentucky

Kaizen



- Kaizen in itself is simply bit-by-bit improvement in practices and day-to-day accumulation of the results which are implemented as participative activities at worksites of Japanese companies
- Historical reasons
 - Japanese are generally stronger in practice-oriented inductive ways of doing research and development than in theory-oriented deductive ways.
 - Japanese have an inclination to work cooperative ways within a team, rather than as individuals in division of labor (Encyclopedia of Japanese Business and Management)

Three Dimensions of Kaizen



Day-to-day improvement practices on the shopfloor by all members (Quality control circles)

Activities that are narrower and deeper and more technology oriented and led by groups of specialists and technicians

At the management or overall company level and at the production management level (Total Quality Control TQC and Total Production Management TPM)

Some More TPS Concepts



- *genchi genbutsu* = New hires are sent to the the shop floor to “go and see” and then report back on what they see
- *gemba* = the actual workplace
- *hanseikai* = reflection meeting
- *Hoshin kanri* = policy deployment
(Toyota`s way of cascading objectives from the top of the company down to the work group level)