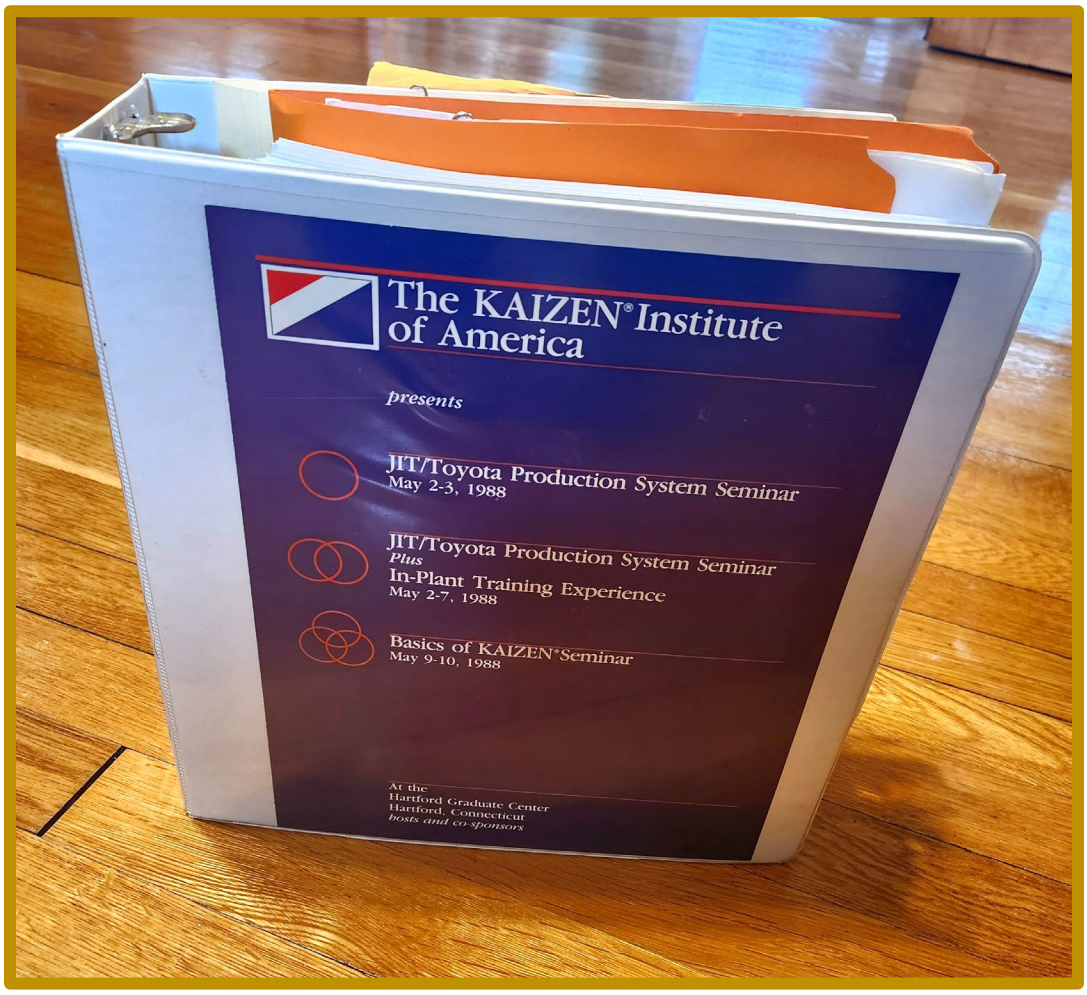
Insights into the History of Progressive Management

✶ Part 3 of 4 ✶



TPS and Kaizen Training by The Kaizen Institute and Shingijutsu

Hartford Graduate Center, May 1988

Hartford, Connecticut, USA

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What was going on before "Lean" entered the scene in the Fall of 1988?

The Hartford Graduate Center (later known as Rensselaer at Hartford*) was a major site where the Toyota production system and Kaizen were introduced to business leaders from across North America.

It is the origin story of Danaher's involvement with Toyota's production system and kaizen, and that would later evolve into the Danaher Business System. In attendance were George Koenigsaecker, Art Byrne, John Cosentino, and Bob Pentland.

Art Byrne would later become the President and CEO of The Wiremold Company. Their transformation was described in my Shingo Prize-Winning book, *Better Thinking, Better Results*.

Several more of these Kaizen Institute seminars were held at the Hartford Graduate Center in 1989 and 1990, but without Shingijutsu (post-1989).

Special thanks to Alice Heist, Corporate Relations Manager at the Hartford Graduate Center, for preserving these important records!

The following pages are training slides selected from the 2-3 May 1988 JIT/Toyota Production System Seminar given by Yoshiki Iwata, Chihiro Nakao, and Akiro Takenaka.

Notice the focus on changing the production and management system through kaizen, and the emphasis on understanding and improving the work. This differs substantially from where Lean management is today. It has been reduced to a small suite of popular tools that have been absorbed into classical management and their use is typically circumscribed to lower-level workers.

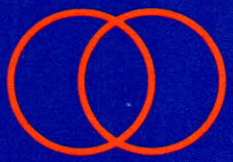
Hopefully, this will inspire you to return to the roots of improvement: kaizen.

* I worked at Rensselaer at Hartford as a clinical professor in the Lally School of Management and Technology from 1999 to 2004. The name has since been changed to "Rensselaer at Work." See https://en.wikipedia.org/wiki/Rensselaer_at_Work

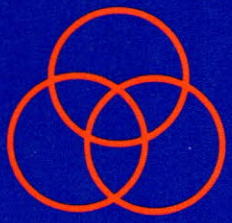
The KAIZEN® Institute of America

presents

JIT/Toyota Production System Seminar
May 2-3, 1988



JIT/Toyota Production System Seminar
Plus
In-Plant Training Experience
May 2-7, 1988



Basics of KAIZEN® Seminar
May 9-10, 1988

At the
Hartford Graduate Center
Hartford, Connecticut
hosts and co-sponsors

The KAIZEN® Institute of America

The KAIZEN Institute of America was created by Masaaki Imai, chairman of The Cambridge Corporation, one of Japan's most prominent international management consulting firms, to meet the increasing demand for learning and implementing the KAIZEN concepts, systems and management tools in American corporations and organizations. KAIZEN in Japanese means gradual, incremental and constant *improvement* that involves everyone in the organization - from top executives to line workers.

Through many programs and consulting services, the Institute offers specialized public or private, in-house opportunities for management to keep abreast of the latest developments in quality improvement, greater productivity techniques and increased competitiveness—from Japan, the United States and other major world centers.

Expert Seminar Leaders and Instructors

These practical, but intensive seminars are taught by a staff of specialists whose practical knowledge is supplemented by their continuous in-the-field assignments in Japan or other key industrial markets.

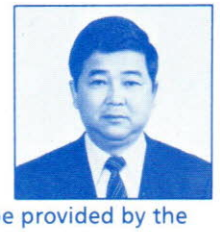
Featuring:

Masaaki Imai, chairman, Cambridge Corporation (Japan), president, KAIZEN Institute of America and author of the best-selling book, *KAIZEN: The Key to Japan's Competitive Success.*

Yoshiki Iwata, president, New Technology Institute, renowned leading consultant on Toyota's famous Kanban Production System (JIT) and former manager of Toyoda Gosei's JIT Implementation Office, where he became a disciple of Taiichi Ohno, former vice president of Toyota Motor Co. and founder of its revolutionary production system.

Chihiro Nakao, vice president, New Technology Institute and the manager responsible for introducing the Toyota production system to Taiho Kogyo Co., Ltd., a Toyota Group company. He is particularly recognized for outstanding work in the fields of *Jidohka* and *SMED.*

Akiro Takenaka, managing director, New Technology Institute and former production engineer who worked with Mr. Ohno in implementing the new Toyota Production System. He is an expert on building *standardized work systems*, and is in great demand in Japan as a top-notch trainer in this field.



Special assistance and group leadership will be provided by the U.S.-based KAIZEN consultants.

JIT/Toyota Production System Seminar

PROGRAM A: 2 Days, May 2-3, 1988

Seminar Description
This seminar provides the concepts of Just-in-Time production systems as they were originally developed by Toyota Motor Co. and implemented at the Toyota Group companies. For two days, the Toyota Production System will be introduced, examined and put into practical terms for application by participants in their companies. Using a course manual, complete with reference materials and schematic diagrams, this seminar will help you define and analyze your firms production and productivity requirements.

May 2: Introduction of JIT
- TAKT time
- Man and machine - separation of work
- Even-flow production
- Standardized work

Jidohka
- Automation vs. Jidohka
- Jidohka and Andon
- Building quality into the production process

May 3: Standardized Work
- Optimized combination of man and machine
- QCD as super-ordinate goals
- Standardized work vs. work standard
- TAKT time and cycle time
- Sequence of work
- Standard work in process

KAIZEN in Standardized Work
- Sequence of KAIZEN
- Work KAIZEN vs. Equipment KAIZEN
- Inventory reduction
- Defective reduction
- Production capability improvement

Who Should Attend?
Production managers, engineering supervisors, senior management, operations or anyone seeking an overview of the basics of JIT/Toyota Production Systems.

JIT/Toyota Production System Seminar *Plus* In-Plant Training Experience

PROGRAM B: 6 Days, May 2-7, 1988

Seminar Description
Following completion of the two-day seminar on JIT/Toyota Production Systems, participants will explore the practical applications of their new knowledge as we visit a local company for an in-plant training experience. The "hands-on" training and observation of an actual case-study-in-progress will enable participants to train others in their company in applying these tools and skills.

May 2-3: See Program A Agenda
May 4: How to Prepare Work Sheets
- Production capacity sheet
- Standard operation combination sheet
- Standard operations sheet
- Observation and measurement of work time
- Classroom exercises

May 5: Production Facility Workshop
- Observe processes and prepare process capability tables
- Prepare standard operations combination sheet
- Preparation of standard operation sheet
- Identify bottlenecks and establish aims for KAIZEN

May 6: Production Facility Workshop
- Study various KAIZEN alternatives
- Implement KAIZEN
- Time measurements after KAIZEN
- Preparation of various work sheets
- Comparison of results

May 7: Reporting KAIZEN
- What problems were encountered
- What countermeasures can be suggested
- Questions and answers

Who Should Attend? (Note: Limited to the first 40 registrants.)
Anyone interested in teaching or applying the tools of JIT/Toyota Production Systems within their own company. Program B includes the two-day basic introduction to JIT (Program A) necessary before this group goes on-site to a local plant for the training experience.

Basics of KAIZEN® Seminar

PROGRAM C: 2 days, May 9-10, 1988

Seminar Description
This seminar builds on a basic understanding of the concepts, systems and tools of KAIZEN—the exciting method for improving quality, increasing productivity and enhancing competitiveness and profitability. Each participant will receive a complimentary copy of *KAIZEN: The Key to Japan's Competitive Success* authored by Masaaki Imai, seminar leader.

Mr. Imai and several KAIZEN Institute's American consultants will present a clear understanding of how KAIZEN creates a synergism between a company's social and technical operations, as it integrates human resources, quality, delivery and cost improvements.

May 9: Introduction to KAIZEN
- The KAIZEN strategy
- The KAIZEN umbrella
- What is management?
- Standardization vs. KAIZEN vs. Innovation

KAIZEN Seven Concepts/Principles

May 10: KAIZEN Systems
- Hoshin Kanri (policy deployment)
- Standardization
- Small group activities
- Teian (suggestion) systems
- Quality Function Deployment (QFD)
- Cross-functional management (CFM)
  - — Total Quality Control (TQC)
  - — Just-In-Time (JIT)
  - — Total Productive Maintenance (TPM)

KAIZEN Tools
- Basic seven tools
- New seven tools
- Team building
- Communications
- KAIZEN check lists

Who Should Attend?
Senior management, quality control, administration, human resources, personnel, sales/marketing, finance, information services and anyone in management seeking information on KAIZEN's concepts, methods, and tools for increasing competitiveness and profitability.

JIT/Toyota Production System Seminar; In-Plant Training Experience and Basics of KAIZEN® Seminar

PROGRAM D: 9 days, May 2-10, 1988

A special combination package at a substantial savings is available. Program includes all programs (B and C), from May 2-10. It includes a complimentary recreation/social program on May 8.

Fees

PROGRAM A: JIT/Toyota Production System Seminar
(2 days), May 2-3, 1988; $1,100.00 per person

PROGRAM B: JIT/Toyota Production System Seminar *Plus* In-Plant Training Experience
(6 days), May 2-7, 1988; $2,500.00 per person

PROGRAM C: Basics of KAIZEN Seminar
(2 days), May 9-10, 1988; $1,100.00 per person

PROGRAM D: Combination Package (B + C)
(9 days), May 2-10, 1988 including a complimentary recreation program on May 8; $3,000.00 per person

Make checks payable to The KAIZEN Institute of America.

Notes

1. Each additional person from same company will receive a 10% discount for Programs A, B or C.

2. PROGRAM D, the combination package, saves $600 per person.

3. Program fees include all materials, continental breakfasts, luncheons, instructor fees and breaktime refreshments.

4. In the event of cancellation, registration fee will be refunded if written notice is received prior to April 15, 1988.

For further information contact: Alice Heist, Hartford Graduate Center, 275 Windsor Street, Hartford, CT 06120-2991, Phone: 203/548-2418, FAX: 203/649-6169.

Accommodations

A block of rooms has been reserved at the Holiday Inn Hartford, 50 Morgan Street, Hartford, CT 06120, at a special discount rate of $48 per night, single or double (plus $5 per night for parking), plus applicable state and local taxes. Reservations can be made by calling the hotel directly at (203) 549-2400 and identifying yourself as a JIT/KAIZEN seminar registrant. The cut-off date for reservations is April 11, 1988. After that date, available rooms will be at regular rates. A major credit card or first night's deposit is necessary to guarantee arrival after 6:00 p.m.

Registration Form

(Photocopies of registration form are acceptable to preserve brochure.)

Registrant #1 _____ Title _____

Registrant #2 _____ Title _____

Registrant #3 _____ Title _____

Company _____

Street Address _____

City/State/Zip _____

( ) _____ ( ) _____

Telephone FAX

Programs
(check correct boxes)

A	B	C	D
☐	☐	☐	☐
☐	☐	☐	☐
☐	☐	☐	☐

Please mail completed form along with your check made payable to The KAIZEN Institute of America **to: Alice Heist, Hartford Graduate Center, 275 Windsor Street, Hartford, CT 06120-2991.**

Total Registrants _____

Total Amount Paid $_____

The KAIZEN® Institute of America
6065 Cielo Vista
Carmarillo, CA 93010

The Text for JIT/Toyota Production System Seminar

May 2 - 3, 1988

Seminar Leaders and Instructors

Masaaki Imai

Yoshiki Iwata

Chihiro Nakao

Akio Takenaka

Sponsors : **The KAIZEN Institute of America**

Co-sponsors : **Hartford Graduate Center**

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I. Basic Concept

(Roles of manufacturing department in the age of limited-quantity production)

1. Cost reduction rather than adding profit to cost.

2. Manufacture only products that can sell.

3. Products cost different by the way they are made.

4. Promote thorough elimination of muda (waste).

5. Make better products at less cost.

II. Toyota Production System

1. "Just in time" production

1) Production by takt time

A) Separation of human work from machine work.

B) "Flow" concept of production process.

C) Standard work

2) Make products just as many as needed by the next process

A) Next process coming to pick up.
Make only the amount depleted.

B) Reduction of set-up time for small-lot production.

C) Combined flow of products and information and its mechanism.

2. "Autonomation" (Jidohka)

1) Difference between Jidohka and automation

2) Jidohka and "andon"

3) Build in quality during production process.

III. Standard Work

1. What is standard work?

1) Definition

The work that will ensure the most efficient production through the best combination of man and machine.

2) Purpose

A) Clarify the rules of the way to manufacture

Standard work forms the basis of how to manage production control. It is determined by taking into consideration such factors as quality, volume, cost and safety.

B) Tools for Kaizen

There can be no Kaizen where there are no standards.

One should make distinctions between what is normal and what is not normal.

3) Standard work and work standard

Work standard means all kinds of working rules for performing standard work properly.

Ex: Operation manuals, working rules, work specifications, and QC process table, etc.

2. Three elements of standard work

1) Conditions

A) Based on human motion

B) Repetitive work

C) The field supervisor is responsible for making standard work.

2) Three elements of standard work

A) Takt time

B) Work sequence

C) Standard work in-process (WIP)

A) Takt time

$$\text{Takt time} = \frac{\text{Working time for the day}}{\text{No. of pieces sold in the day}}$$

Cycle time --- Total manual working time in a series of work (Net working time)

Note: In measuring manual time, allow sufficient time for a normal worker to do the job without physical strain. (Supervisor)

B) Work sequence

* This is not the machining sequence for manufacturing a product; it is the sequence of work like bringing material, loading it and unloading it after machining by the operator.

* Such a work requires multi-skilled operators.

C) Standard work in-process

* Minimum level of work in-process, required for a repetitive work to be performed in the same steps, and concerns items fed into the machine, or on the conveyor, or items that require cooling off, etc.

Viewed from the work sequence (with respect to the process -ing order)	Work in the flowing direction	0 piece
	Work in the reverse direction	1 piece
Viewed from the auto-feed feature (with or without it)	With auto-feed	1 piece
	Without auto-feed	0 piece

Principle of standard work in-process.

3. Kaizen through standard work

1) Sequence of Kaizen through standard work

Re-arranging the working step
↓
Training in repetitive work
↓
Current work (Status Quo)
↓
(Kaizen)

① Observe and put your findings into sheet

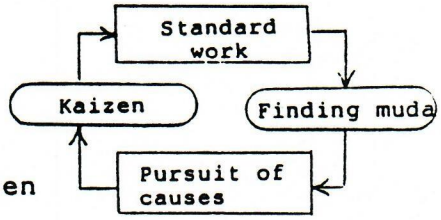
- Process production capacity table
- Standard work combination sheet

② The work will be arranged and training will be provided so that it can be repeated

③ Look for problems and muda and seek causes of trouble; and try to push Kaizen

④ Prepare a new standard work sheet

⑤ It is essential to repeat the above cycle.



2) Work Kaizen and equipment Kaizen

A) Work Kaizen

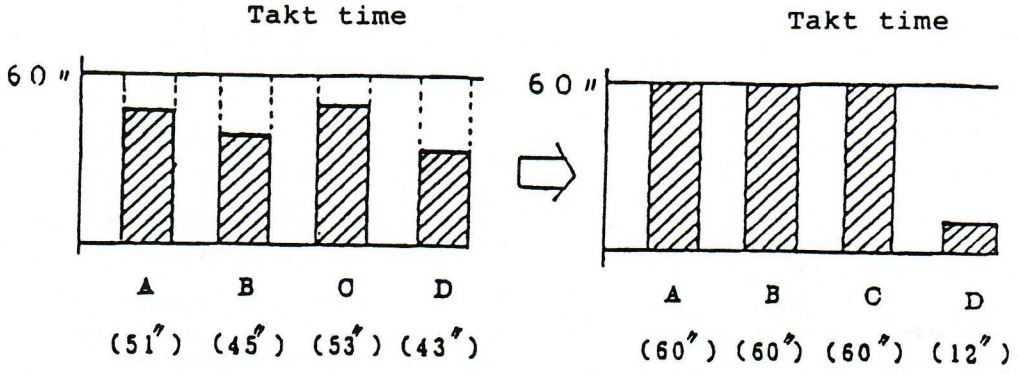
* Change the work sequence or combination of work
* Change layout of items, tools, cart,etc.
* Change or provide, simple working aids, chutes, ejectors, hangers and so on

B) Equipment and facility Kaizen

* It costs money
* It takes time
* No rework allowed
* Not always linked to cost reduction
* (Bound to fail without previous practice of work-Kaizen)

3) Kaizen points

A) Man-hour reduction



i) Measure the working time for Mr. A, B, C and D.

ii) Waiting time is focussed on one person. → You have only to focus on 12 sec. for Kaizen.

iii) Perform work Kaizen

* Is there any unnecessary (muda) move while walking? --- Parts arrangement, layout
* Any deviations in the work?
* Hand movement --- Parts arrangement, position of starter button
* Other

B) Reduction in work-in-process

i) Separate the necessary stock (standard work in-process) from the excess stock ← In-process stock

ii) Review inventory of finished products

* "Levelled" production
* Shortening the set-up time
* Transfer of work pieces in smaller lots
* Ensure stable operations of equipment
* Quality stability
* Other

C) Quality Defect Reduction

i) Carry out the countermeasures.

a) Identify the cause of trouble
--- Repeat "Why?"
b) Figure out the countermeasures, and carry it out.
c) Follow it up carefully.

ii) Provide a mechanism to make it easier to find the cause of trouble.

a) Repeat the work under the same conditions.

b) Do not change the working steps, or work order --- "Flow" production

c) Inspect the machined piece right after machining --- Production lead time

It is desirable to let the operator inspect the finished work-piece, who has just worked on it.

d) Provide measures for "fool-proof".

D) Increase in production capacity

i) Detect the bottleneck process.

a) Process production capacity table, and standard work combination sheet.

b) Watch the way the machines operate.

c) Identify what motion will be "money-making".

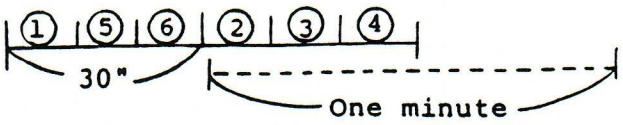
ii) Methods to step up production capacity

a)

① Unload the work ② Inspection ③ Burr removal
④ Put in box ⑤ Load the work ⑥ Start-up

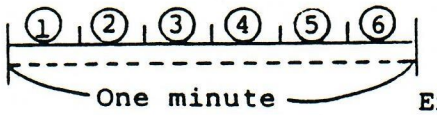
Completion time: 2 minutes

b)



Completion time: one minute and 30 seconds
(shortened by 30 seconds)

c)



Example: Rotary table

Completion time: One minute

iii) Shortening of machine motion

A series of work to be broken down into work elements.

E) Make a better layout

i) Layout conditions --- Flexible layout

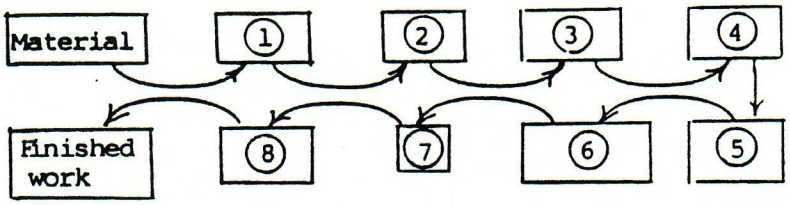
The production line based on
- a. Material flow
- b. Human flow
- c. Information flow

(Note) The line permitting the operator to perform the standard work.

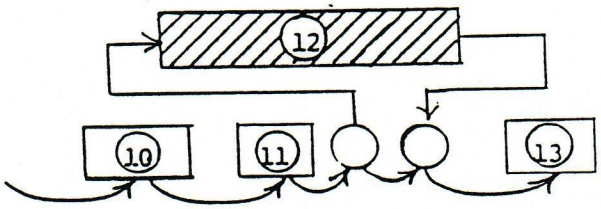
The line that can be handled by either one or two operators.

ii) Sample of basic layout

a. ▭ - like layout



b. Mixed layout with autonomation equipment (Jidohka)



(Note) Separate the human zone from that of autonomation.

F) The line that makes possible visual management

i) Use of standard work sheet

ii) Use of "andon" (warning lights)

iii) Use of production schedule board

4. How to practice Kaizen

1) Considerations for the element

A) People

i) Don't increase operators easily.

ii) Train multi-skilled operators.

B) Equipment --- Develop softwear before developing hardware.

i) Don't complain easily about the lack of machining capacity.

ii) Prepare equipment at low cost, meeting the volume of work-pieces to be processed.

a) Making what is needed, and one at a time.

b) Equipment that can produce within the takt time.

iii) Equipment that has a universal range of applications

C) Quality

i) Defective products increase the cost ten times.

ii) The flow method of production improves quality.

iii) Pursue root cause.

D) Safety

i) Safety first.

ii) Working in safety begins with establishing and observing standard work.

2) Summary

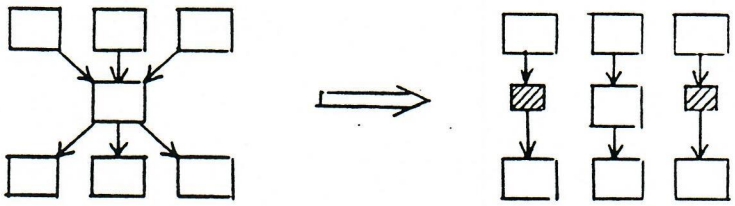
A) Constant pursuit of "Just in time" and "Jidohka"

i) Throughput time = Processing time + Idele time
(Equipment Kaizen) (Work Kaizen)
+ Inspection + Transfer

ii) From large-lot production to small-lot production

iii) "Flow" production

Straight flow and turbulent flow



(Turbulent) (Straight)

B) From individual Kaizen to total Kaizen

i) Individual Kaizen ---- Point

ii) Kaizen on the line ---- Line

iii) Kaizen covering a factory as a whole
--- Two dimensional

iv) Kaizen covering the entire company
--- Three dimensional

C) Summary

i) To observe "Gemba" (work shop) is the start of Kaizen.

ii) Kaizen with affection and compassion.

iii) The proof of the pudding is in the eating.

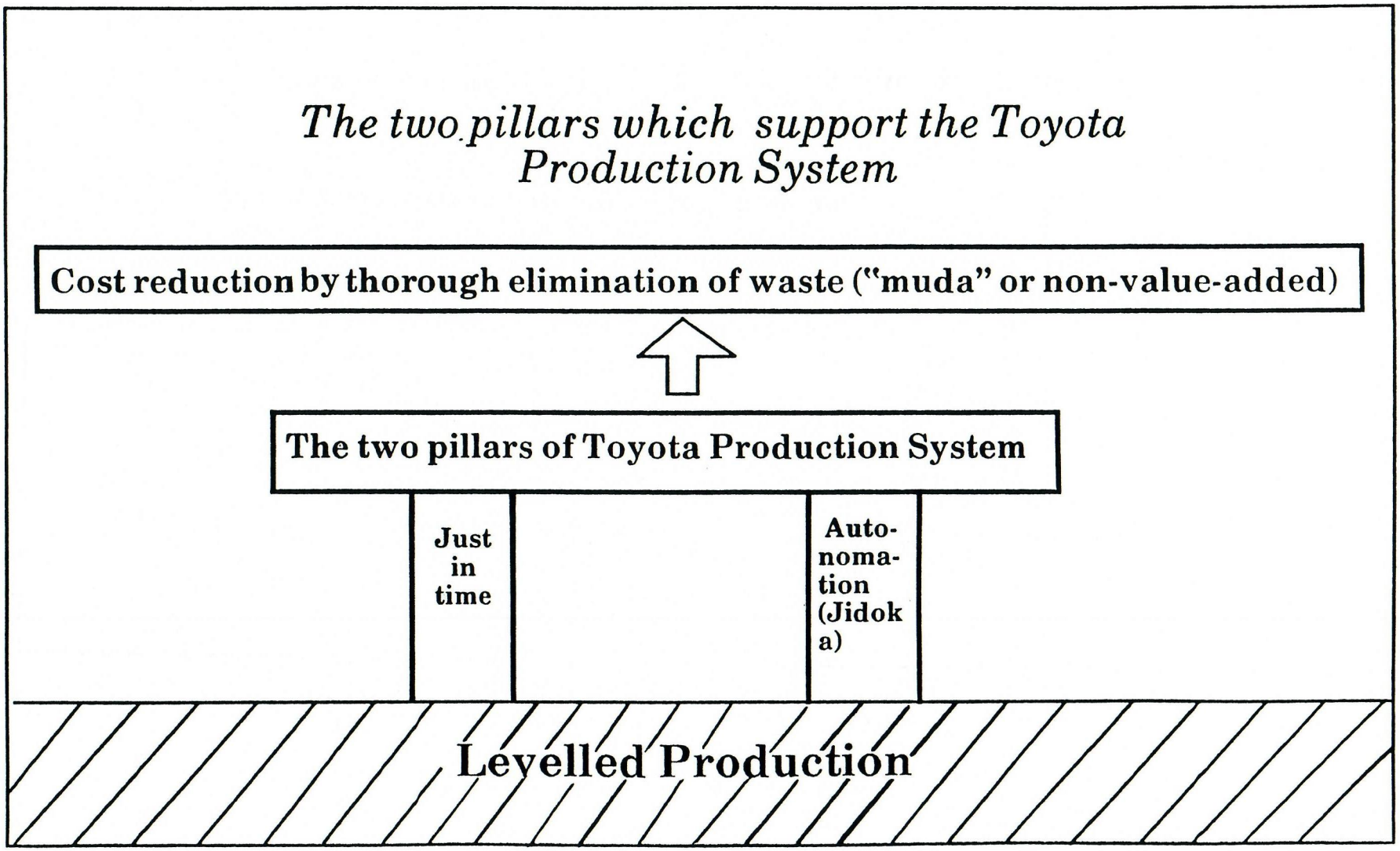
TABLE OF CONTENTS
(Reading Materials)

I. Just-in-Time and KANBAN - Application of Toyota Production System

Yoshiki Iwata
President
New Technology Institute

Building GEMBA strong enough to cope with change

The Challenge to Flow Production


The two pillars which support the Toyota Production System
Cost reduction by thorough elimination of waste ("muda" or non-value-added)
The two pillars of Toyota Production System
Just in time
Auto-noma-tion (Jidok a)
Levelled Production

JUST IN TIME, as one of the pillars of the system

(1) What is needed = a good thing to have = the thing "sold"

(2) In the amount needed = as little as one piece

(3) When it is needed = Just in time for its use

Do not mix up the order from (1) to (3)

Be slightly late for the need by just one piece

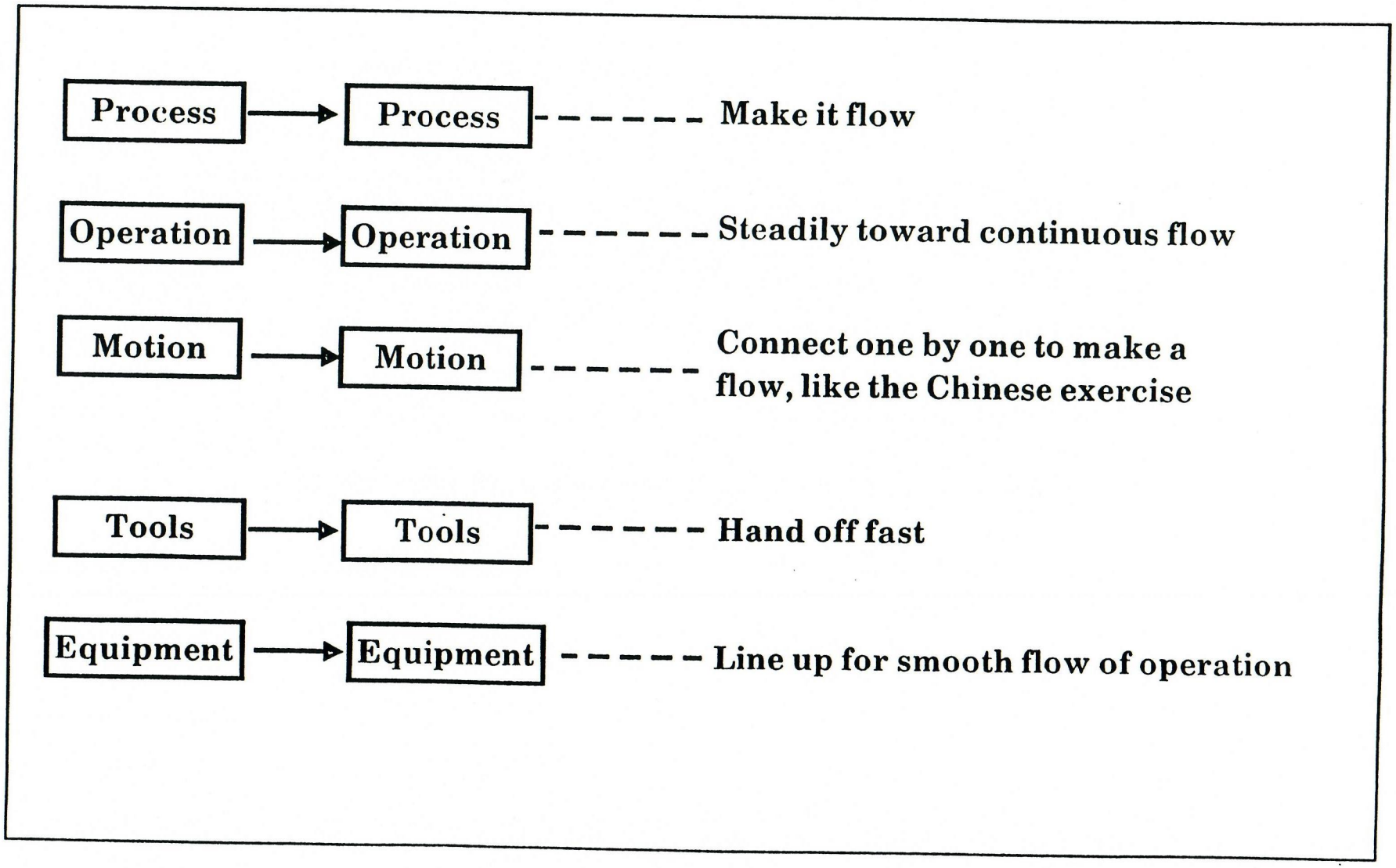
To install Just in Time

It is essential to arrange the processes properly

To do so, it is fundamental

To provide a continuous flow in the processes

FLOW **is make things smooth for the processes to be carried out without disruption**


Process
Process
Make it flow
Operation
Operation
Steadily toward continuous flow
Motion
Motion
Connect one by one to make a flow, like the Chinese exercise
Tools
Tools
Hand off fast
Equipment
Equipment
Line up for smooth flow of operation

Kaizen on standardized work

1. Kaizen steps

(1) **Clarify the need for Kaizen (Objectives)**

(2) **The current practices should be represented in the standardized work**

Take a good look at the current practices and formulate them in a chart

Standardized production capacity sheet

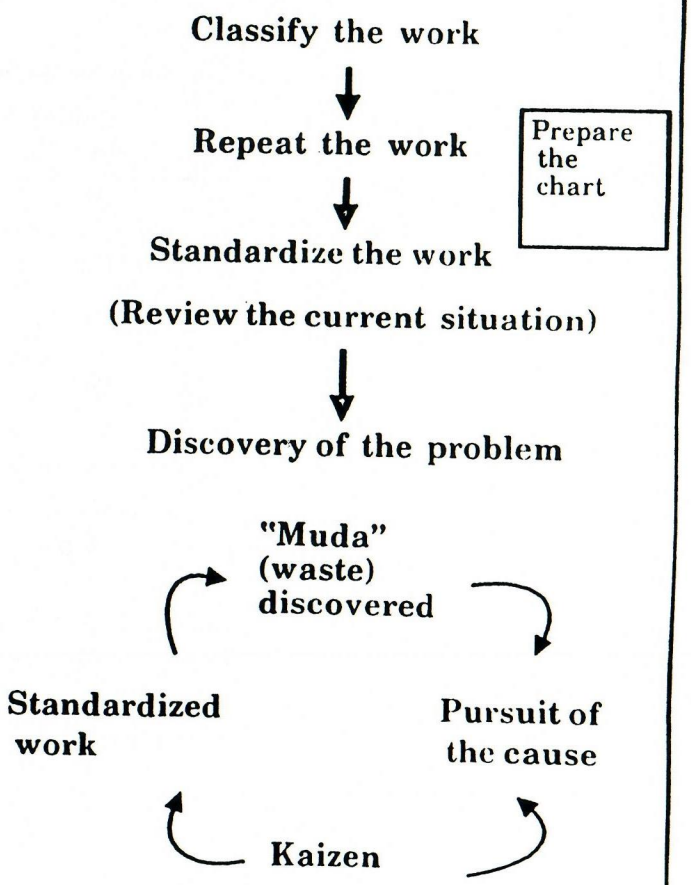
Standardized work combination table

Standardized work chart

(3) **Pick up the problems out of the current situation (Discovery of "muda", or waste)**

(4) **Kaizen**

(5) **Prepare a new standardized work chart**

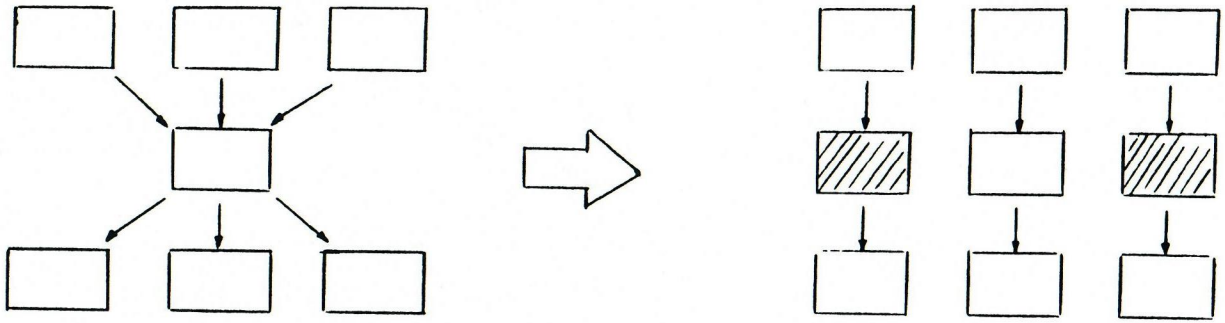


A. Thorough pursuit of "Just in time" and "Autonomation (Jidoka)

(1) Production lead time = Machine time + Waiting (stagnation) time + Transfer + Inspection
(Facility kaizen) (Work kaizen)

(2) From large-lot production to small-lot production

(3) Continuous flowing production Rectifying the flow and turbulence



B. From individual kaizen to kaizen as a whole

(1) Individual kaizen ------ Points

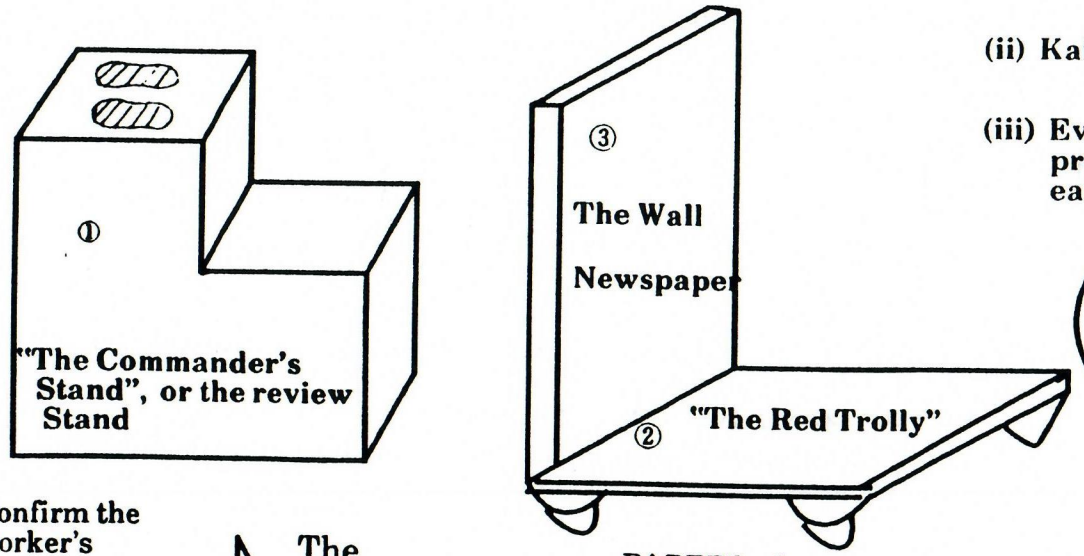
(2) Kaizen of the line ----- Lines

(3) Kaizen of the factory -- Planes

(4) Kaizen on a corporate scale --- A cube

Attitude to listen to real matter in the real place (GEMBA, GEMBUTSU)

The set of three pieces for kaizen



(i) Kaizen starts with taking a look at the real place (jobsite or workshop)

(ii) Kaizen with compassion

(iii) Evidence, not discourse(The proof of the pudding is in the eating)

(What, who, until when --- wall newspaper of KAIZEN)

Confirm the worker's motion and flow of material ⇨ The Review Stand

PARETO of rejected in-process parts and material ⇨ The Red Trolly

- For kaizen, being quick and imperfect works better than being late but perfect

  A trouble can be spotted instantly

- No action, no success

The Basic Philosophy of Toyota Production System

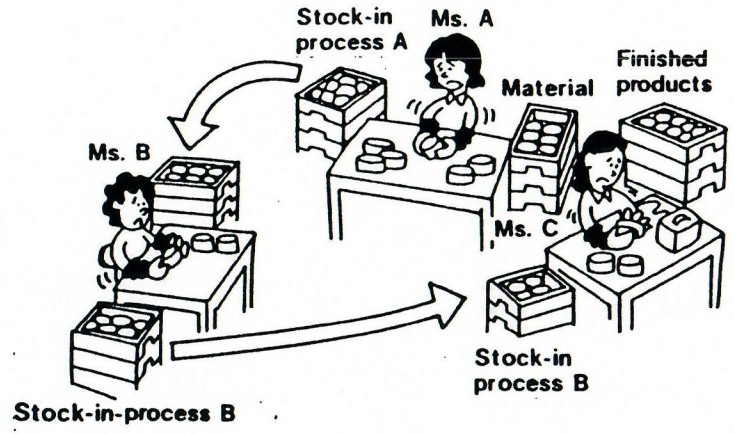
How to manufacture most economically

what is needed (sold)

when it is needed

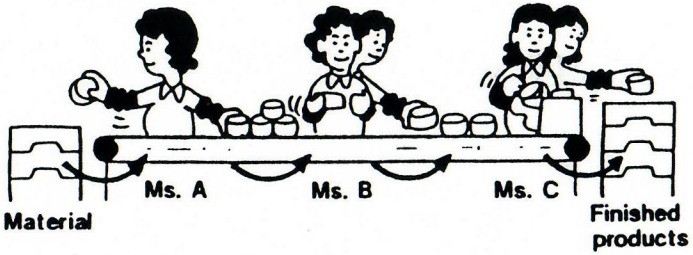
in the amounts needed.

Ordinary Production

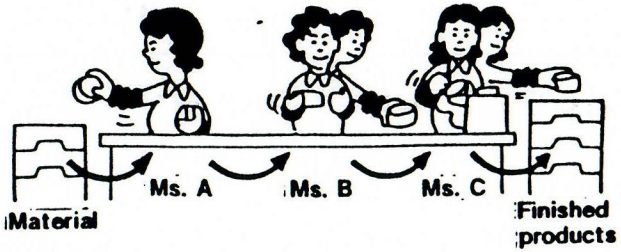


1. Separate work area
2. work -in-process conveyed to next process
3. Require much work in-process

The "Fake" Flow Production



"The Flow" Production



1. Workers placed together.
2. Each works on a single unit. (One-by-one prouction)

Just-in-Time

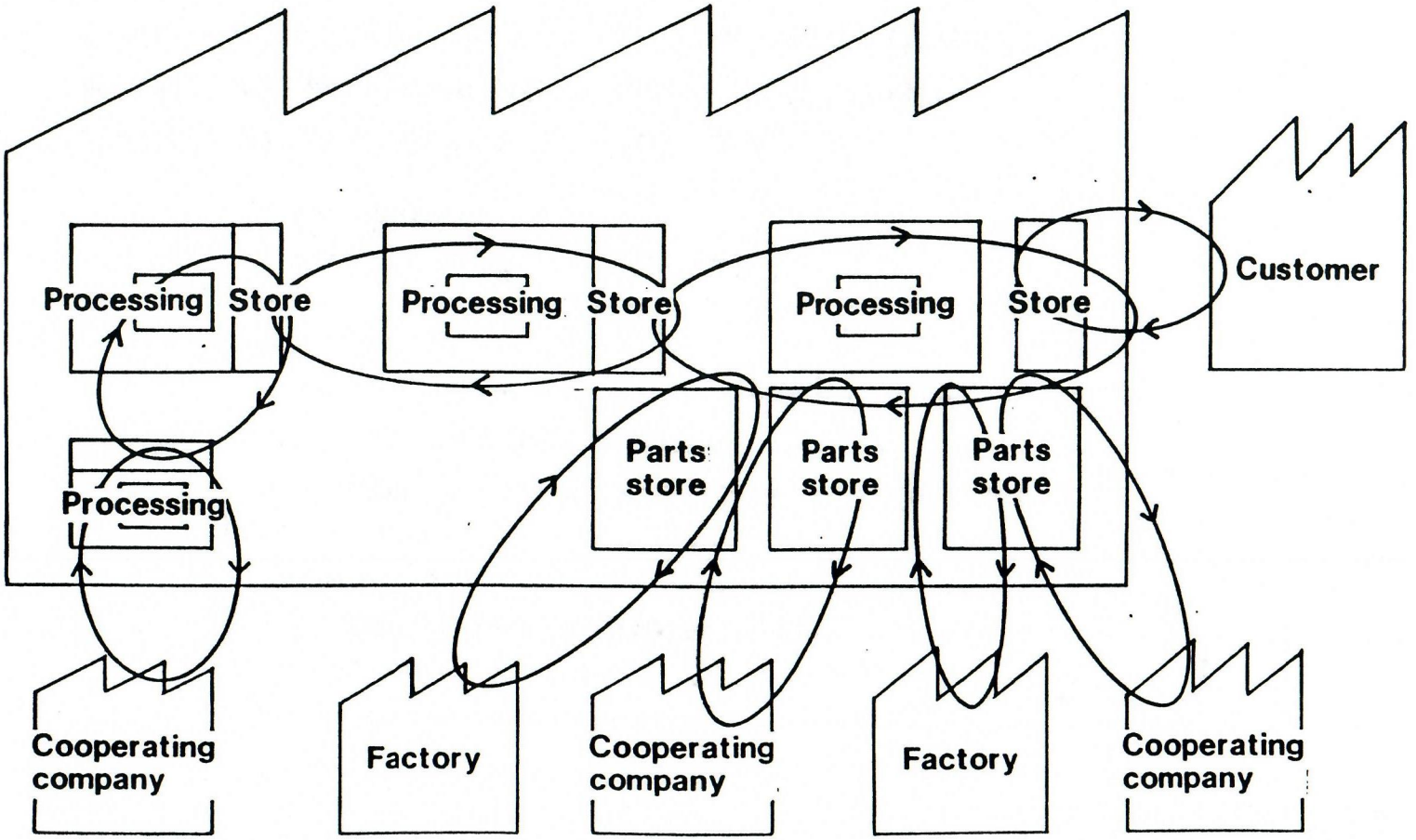
1. The purchaser would rather buy just the right amount of just the right product at just the right time.

2. It is expensive to produce what the market needs, when it is needed in the amounts needed.

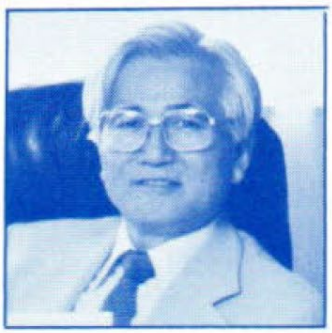
3. The manufacturer finds it most economical to produce what they can as much as they can when they can.

Toyota Production System pursues the best way to produce goods while complying with market needs as shown in 2.

Flow of Information by KANBAN

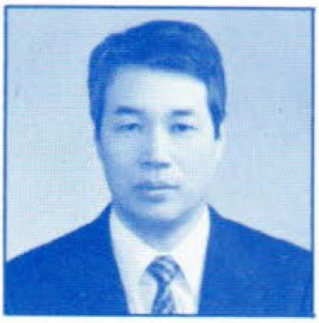


I hope you appreciate the pioneering work of Masaaki Imai and the Kaizen Institute, and Yoshiki Iwata, Chihiro Nakao, Akiro Takenaka and Shingijutsu for bringing kaizen to the world!



Masaaki Imai, chairman, Cambridge Corporation (Japan), president, KAIZEN Institute of America and author of the best-selling book, *KAIZEN: The Key to Japan's Competitive Success.*

Yoshiki Iwata, president, New Technology Institute, renowned leading consultant on Toyota's famous Kanban Production System (JIT) and former manager of Toyoda Gosei's JIT Implementation Office, where he became a disciple of Taiichi Ohno, former vice president of Toyota Motor Co. and founder of its revolutionary production system.



Chihiro Nakao, vice president, New Technology Institute and the manager responsible for introducing the Toyota production system to Taiho Kogyo Co., Ltd., a Toyota Group company. He is particularly recognized for outstanding work in the fields of *Jidohka* and *SMED*.

Akiro Takenaka, managing director, New Technology Institute and former production engineer who worked with Mr. Ohno in implementing the new Toyota Production System. He is an expert on building *standardized work systems*, and is in great demand in Japan as a top-notch trainer in this field.

Special assistance and group leadership will be provided by the U.S.-based KAIZEN consultants.

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NOTE: In 2003, Shingijutsu Co., Ltd. was split into two companies two years after Yoshiki Iwata's death.

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