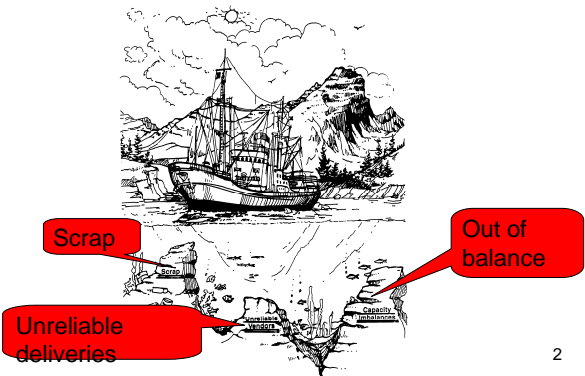


## Stockless Production From Push to Pull

- At HP there was in 1983 a division which wanted to make a change over from Push to Pull.
- It was the Greely Colorado Division
- They made Disc Units
- Their goal was to get a batch quantity of one piece

1

Their idea behind the change was:



2

What did they try to realize at HP:

- Advantages:
  - ↓ Inventory
  - ↓ Lead time
  - ↓ Space
  - ↓ Work on hand
  - ↓ Rework
- Effects:
  - ↑ Quality
  - ↑ Productivity
  - ↑ Involvement

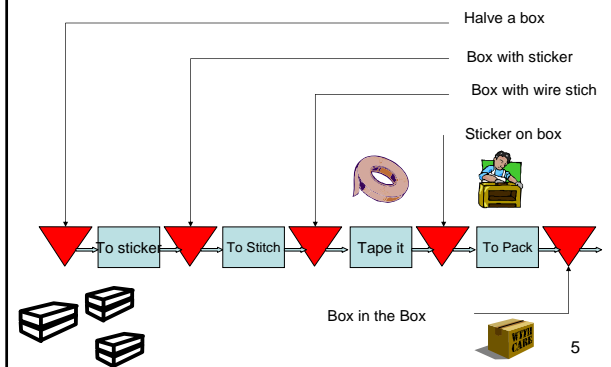
3

## The Film Stockless Production

Be a were of the problems in this simulated production line.  
Don't look only to the working procedures.  
Watch to the people themselves.  
Write down all what you find remarkable.

4

## Produce and Package the Box



5

## Performance-Indicators 1

Method	Push	Pull	Pull
Measurement	6 pieces	3 pieces	1 piece
Space			
Work on Hand			
Cycle time			
Lead time			
Rework			
Quality Problems			

6

## Performance-Indicators 2

Method	Push	Pull	Pull
Measurement	6 pieces	3 pieces	1 piece
Space	2 tables		
Work on Hand	30 pieces		
Cycle time	3:17		
Lead-time	minute		
Rework	26 pieces		
Quality Problems	Hidden		

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## Performance-Indicators 3

Method	Push	Pull	Pull
Measurement	6 pieces	3 pieces	1 piece
Space	2 tables	2 tables	1 tables
Work on Hand	30 pieces	12 pieces	4 pieces
Cycle time	3:17	1:40	0:19
Lead-time	minute	minute	minute
Rework	26 pieces	10 pieces	3 pieces
Quality Problems	Hidden		Visible

8

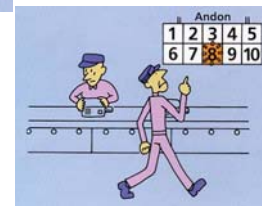
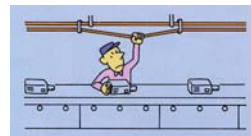
## Results at HP



Subject	Before	After
Inventory	2,8 months	1,2 months
Space	4000 m2	2000m2
Work on Hand	5 days	2,5 days
Productivity	100%	115%

9

## The "fixed-position stop system"



10



11

TIME | ACTUAL | GOAL

01	02	03	04	05	06	07	08
09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24

PRODUCTION STATUS

3CEZ	54
6Y3P	59
7A4C	65
4E8J	45

ANDONS

Takt

04:49

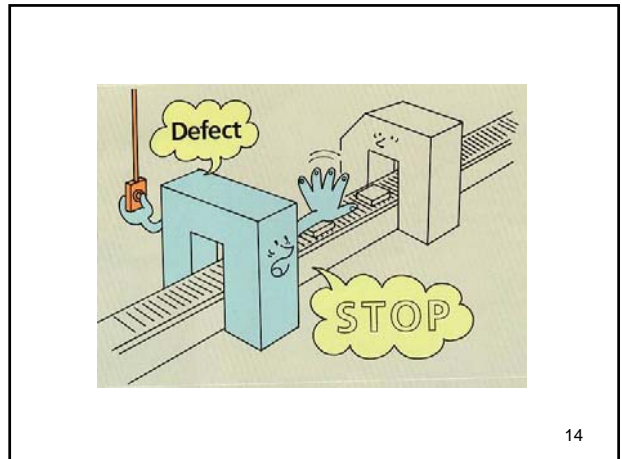
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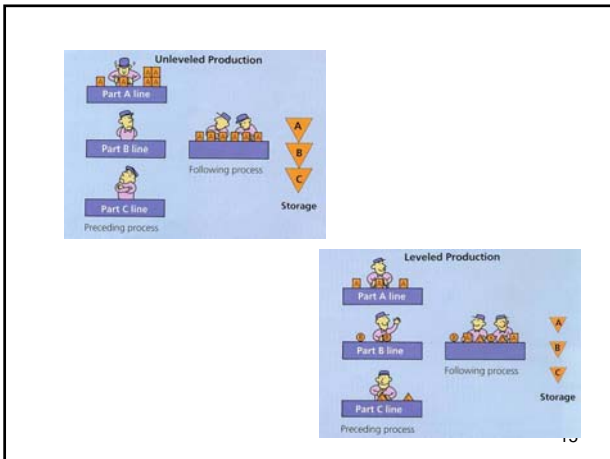
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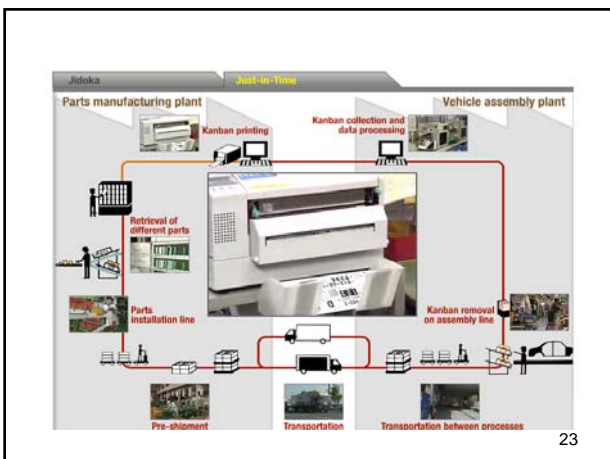
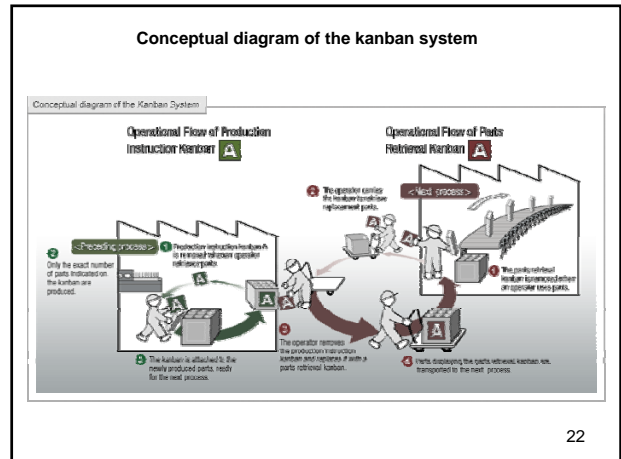
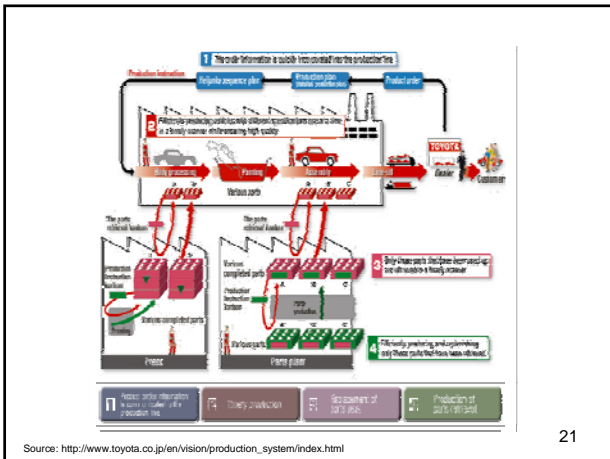
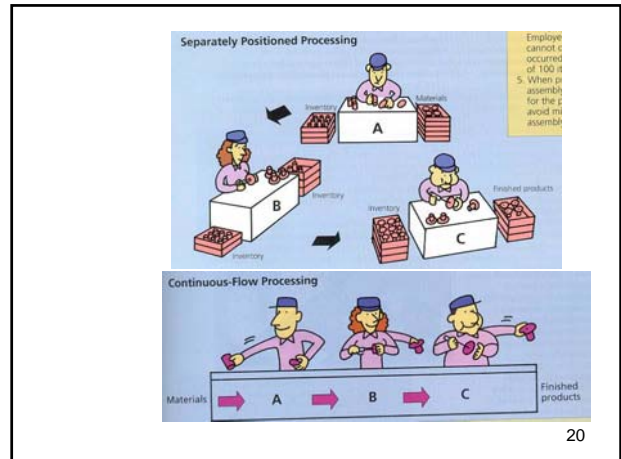
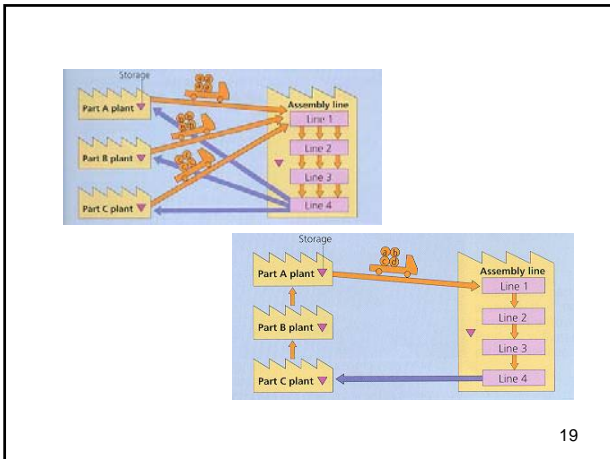
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18



**Sekichi Toyoda (1867-1930)**  
 Toyoda Power Loom equipped with a new web-breakage automatic stopping device (developed in 1896)  
 World's first automatic loom with a non-stop shuttle motion, the Type-G Toyoda Automatic Loom (developed in 1924)

**Kiichiro Toyoda (1894-1952)**  
 Drawing on his experience of introducing a flow production method using a chain conveyor into the assembly line of a textile plant (completed in 1927) with a monthly production capacity of 300 units, Kiichiro Toyoda also introduced this method into the body production line at Toyota Motor Co., Ltd.'s Koromo Plant (present day)

**Eiji Toyoda (1913-)**  
 By ensuring thorough implementation of jidoka and the Just-in-Time method, Eiji Toyoda increased workers' productivity in adding value and realized the Toyota Production System, which enabled Toyota to compete head-on with companies in Europe and the U.S.

**Taiichi Ohno (1912-1990)**  
 With strong backing from Eiji Toyoda, Taiichi Ohno helped establish the Toyota Production System, and laid the foundation for the Toyota spirit of "making things" by, for example, creating the basic framework for the Just-in-Time method.

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