

AME 2002 Conference

**Leadership and the
Toyota Production
System**

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TSSC, Inc**

Toyota Supplier Support Center (TSSC)

**Formed 1992 in response to
increasing interest in the
Toyota Production System or
TPS**

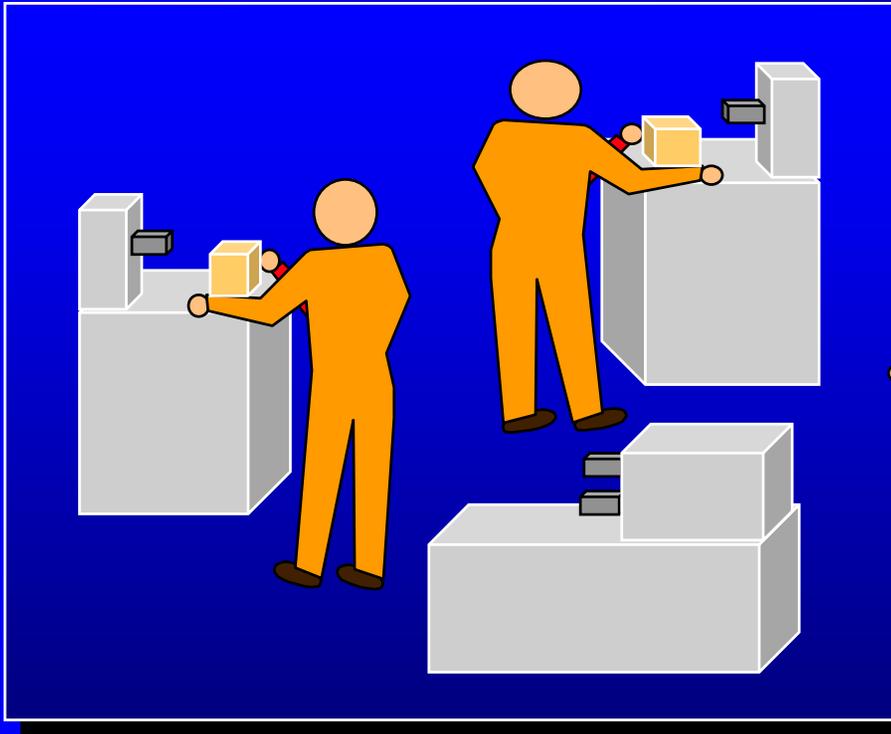
TSSC, Inc.

After 10 years experience in supporting North American companies to implement TPS, TSSC, Inc has been formed in May 2002.

Our focus is to work with companies outside of Toyota who have an interest in TPS and continue Toyota's contribution to society



TSSC, Inc



Why did this result happen?
What is the principle?

➤ Objective:

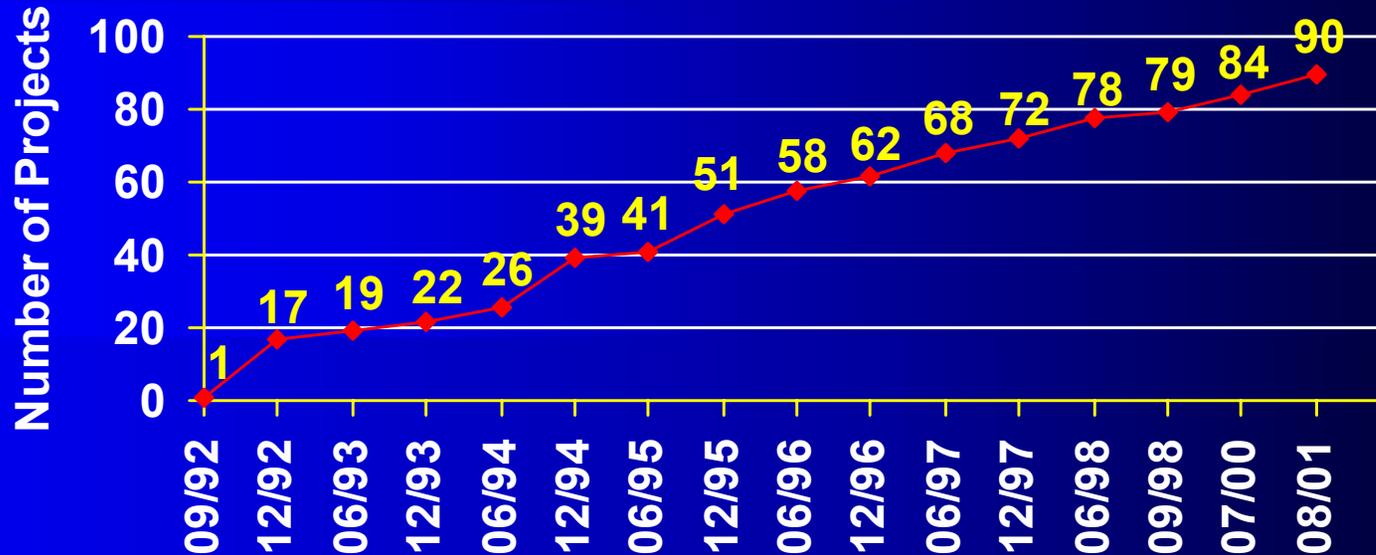
- To assist North American companies in implementing their own version of TPS

➤ Method:

- Create learning through trying and reflecting



Industries We Have Worked With: 1992 - Present



Products

Air Bags
 Air Ducts
 Appliance Trim
 Body Panels
 Engine
 Components
 Exhaust Sys.
 Floor Mats
 Flywheels
 Food Mfg.
 Gas Springs
 Glass
 Heating/Cooling Sys.
 Hospital Beds
 Learning Aids for Blind
 Leather
 Luggage Arm
 Office Furniture
 Pneumatic Fasteners
 Powertrain Components
 Remanufactured Alternators
 Seat Recliner Components

Processes

Shock Absorbers/Struts
 Structural Components
 Temp./Pressure Sensors
 Toys
 Trailer Towing Prod.
 Trim (Int. Ext.; Door)
 Weather Stripping
 Winches
 Windshield Wipers
 Assembly
 Casting
 Forging
 Machining
 Plastic Molding
 Sewing
 Stamping
 Tanning, Cutting
 Welding
 Wire Forming

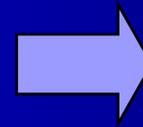
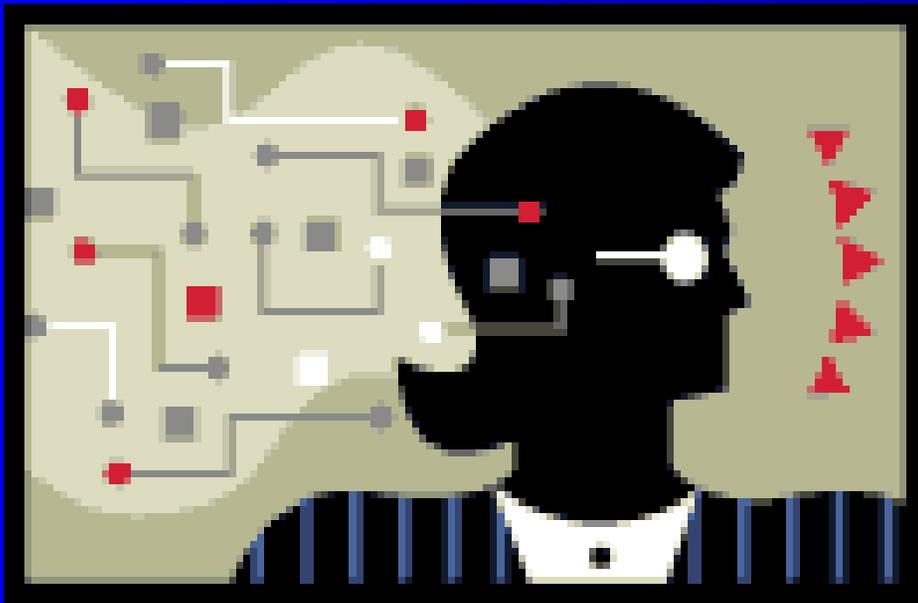


Characteristics of Successful TPS Companies

- **“Plant First” philosophy: Learn TPS on the shop floor**
- **Enthusiasm for improvement**
- **Persistence**
- **Willing to start small, learn through trial and error**

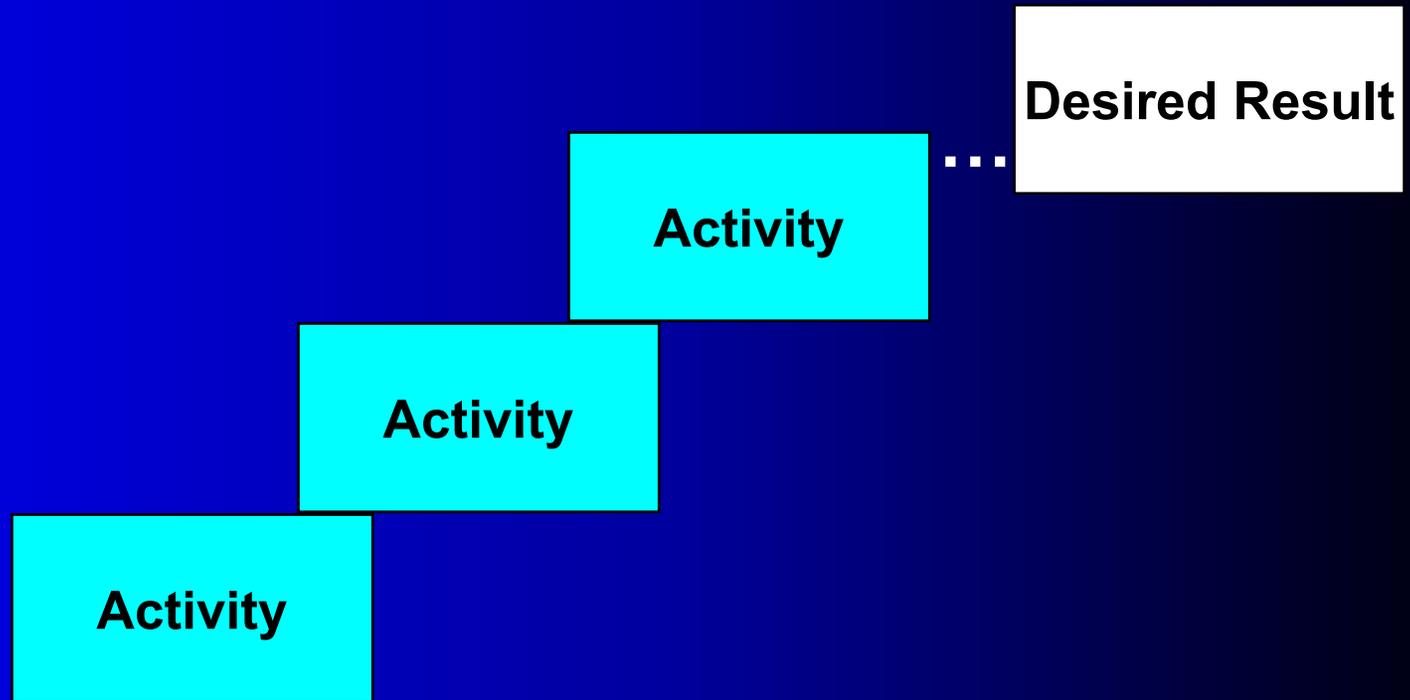
Willing to start small, learn through trial and error

TPS is built on the scientific way of thinking



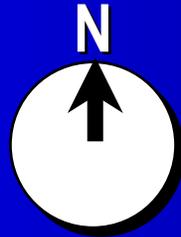
**Develop a way
of thinking how
do I respond to
this problem not
a tool box**

Willing to start small, learn through trial and error



Each activity builds on the other to achieve the desired result

TPS Vision of the Ideal – True North



What We Should Do,
not What We Can Do

Customer Satisfaction

- 0 defects
- 100% value added
- 1x1, in sequence, on demand

+

Human Development

- Physical & Mental Safety
- Security
- Professional Challenge

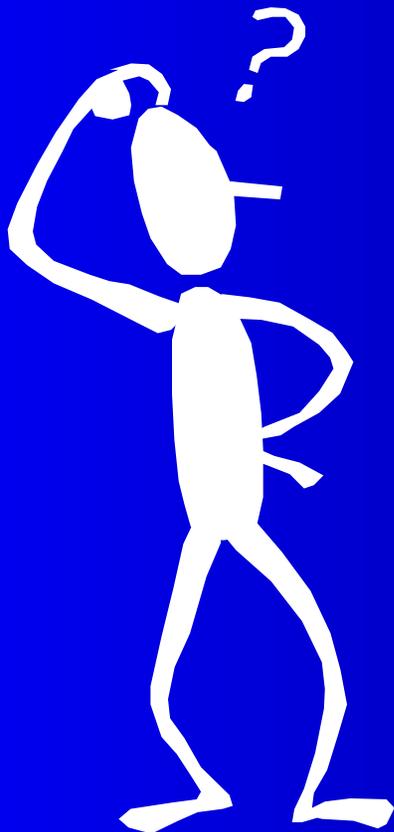


Current Condition



The Journey to True North

Where do I start?



What We Should Do,
not What We Can Do

Customer Satisfaction

- 0 defects
- 100% value added
- 1x1, in sequence, on demand

+

Human Development

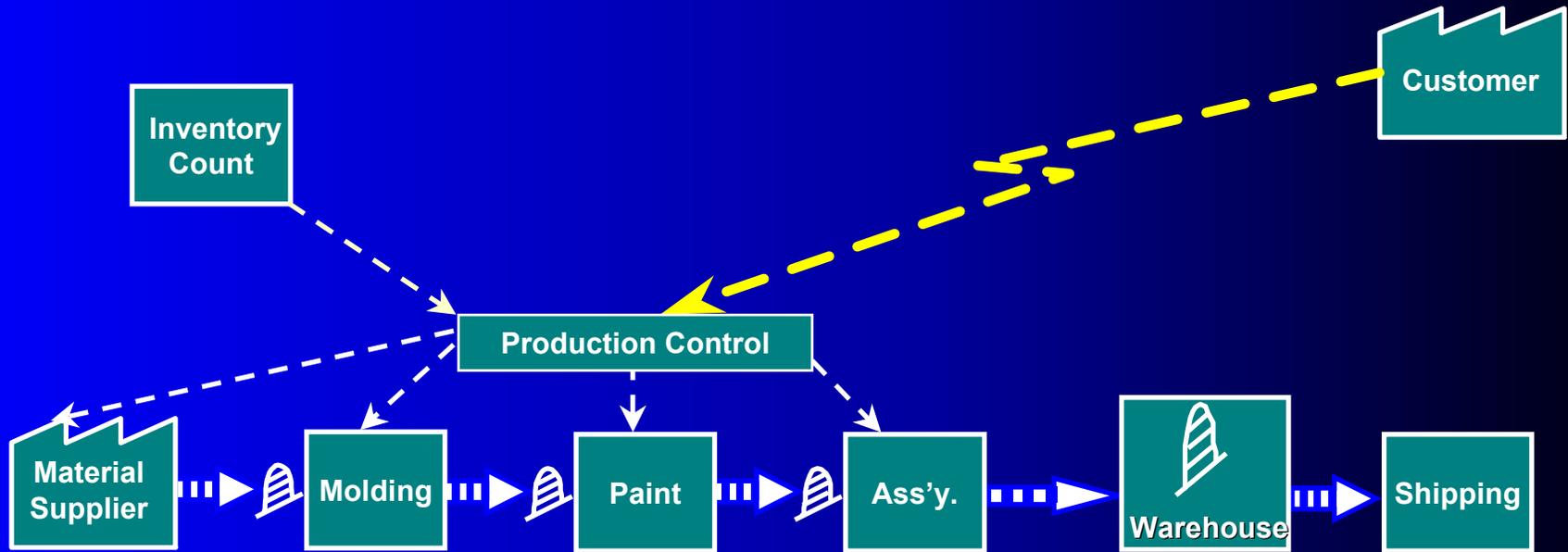
- Physical & Mental Safety
- Security
- Professional Challenge

EVERYONE
every minute
every day

Current Condition

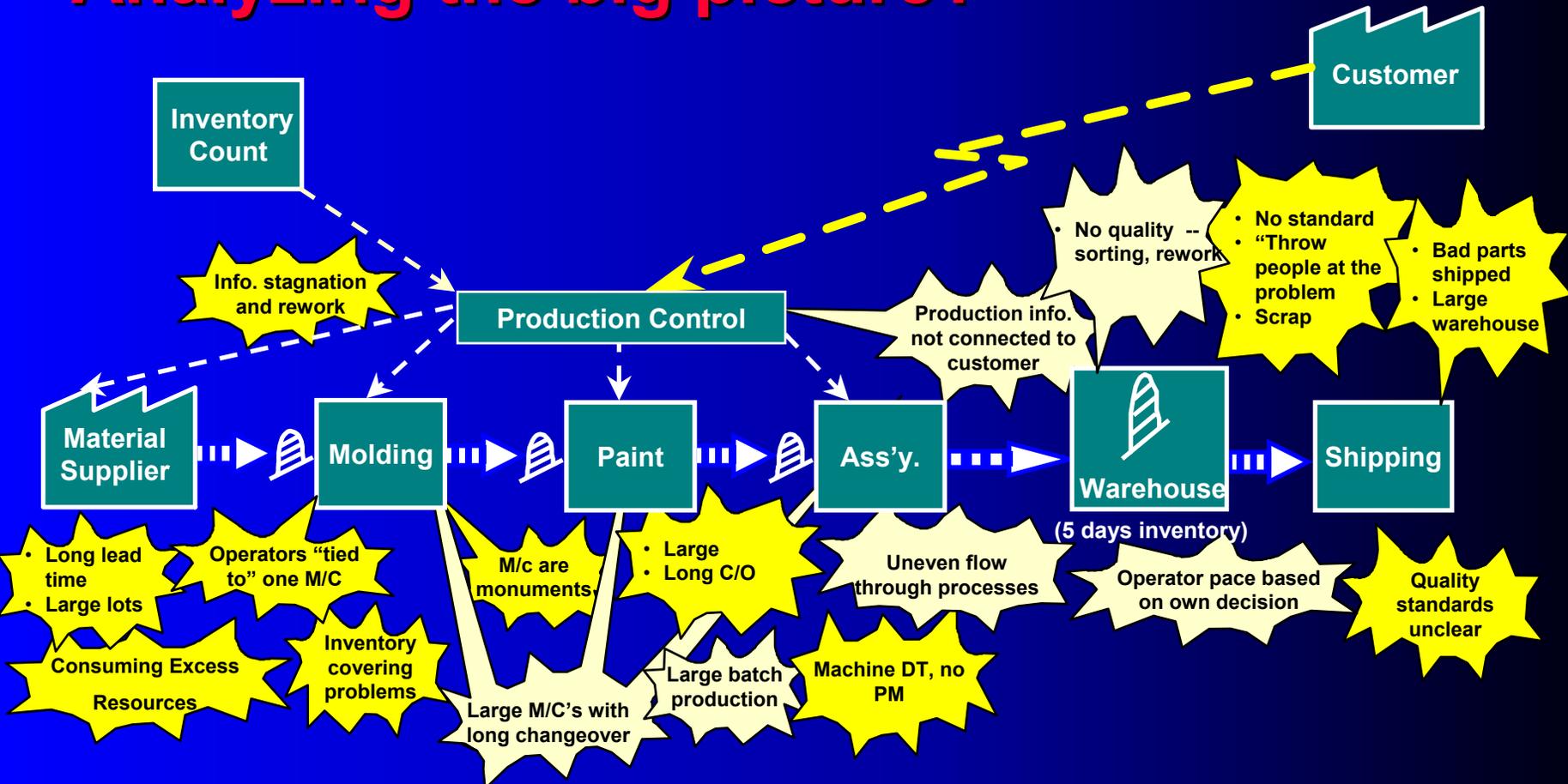
Where do I start?

Analyzing the big picture?



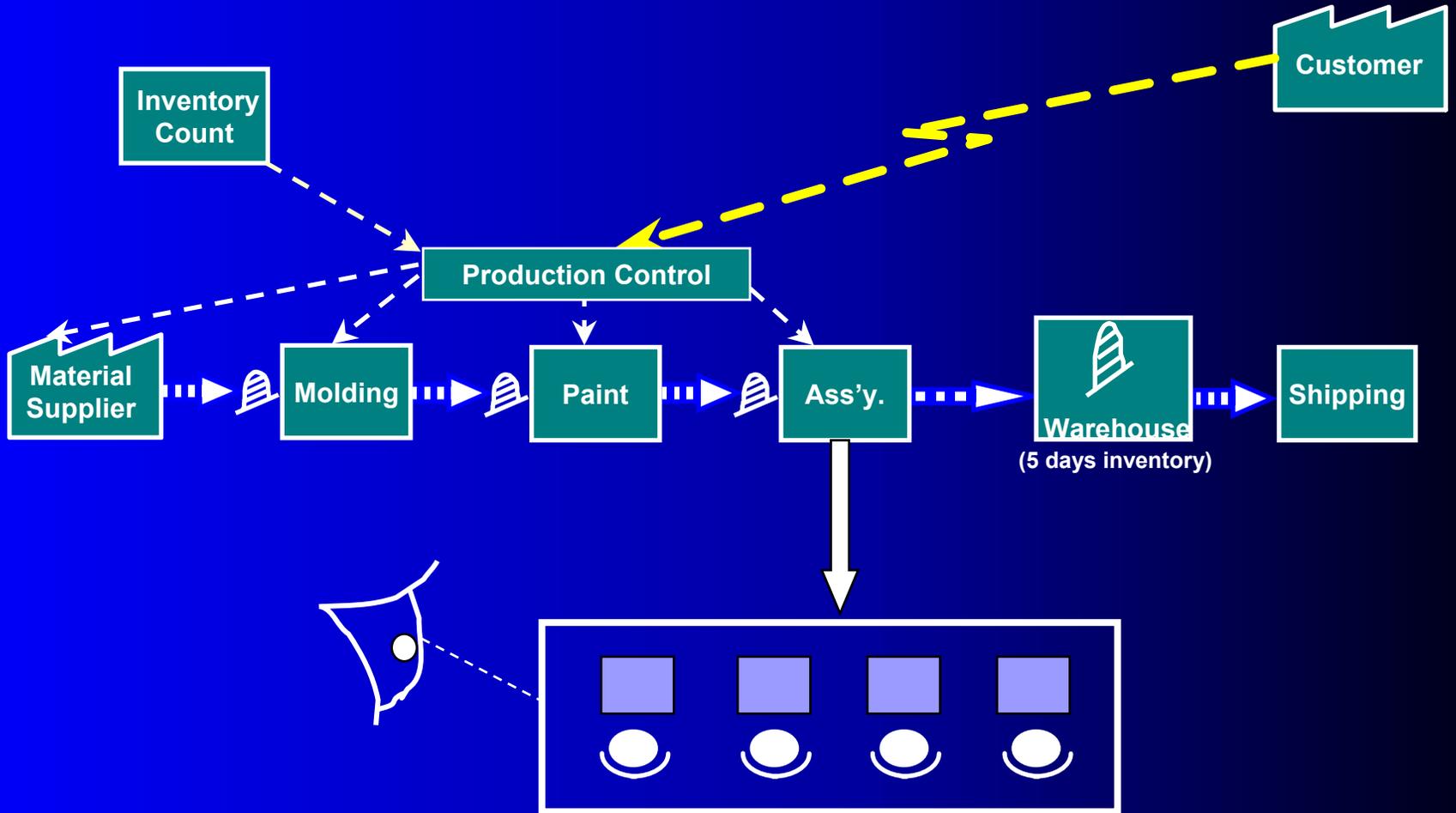
Where does this lead us ...

Analyzing the big picture?



- So many problems – Again where do I start?
- Takes much time for investigation
 - People lose energy – finding problems but not fixing
 - People become frustrated – nothing is changing
- Looking only at the surface
 - What are we observing – skill to see is not developed

Where do I start?



We start at the activity level

Foundation to TPS – Heijunka, Standardized Work and Kaizen

Goal: Highest Quality, Lowest Cost, Shortest Lead Time

Just-In-Time

- Continuous Flow
- Takt Time
- Pull System

Jidoka

- Stop and notify of abnormalities
- Separate man's work and machine's work

Heijunka

**Standardized
Work**

Kaizen

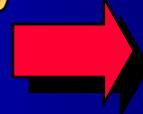
How to See if Activity based on True North?



- Customer Satisfaction**
- 0 defects
 - 100% value added
 - 1x1, in sequence, on demand

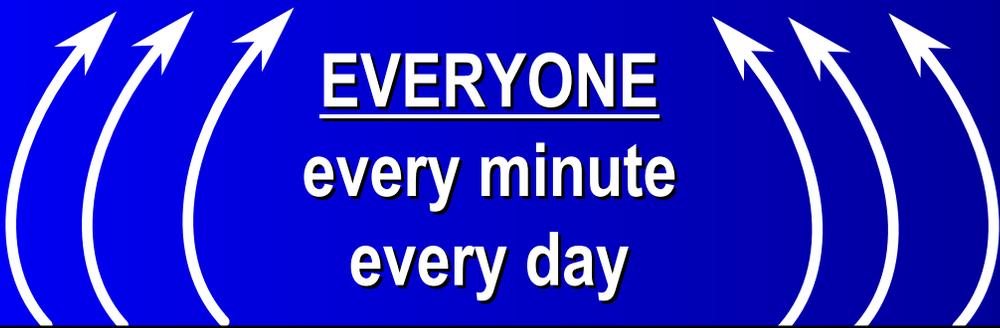


- Human Development**
- Physical & Mental Safety
 - Security
 - Professional Challenge

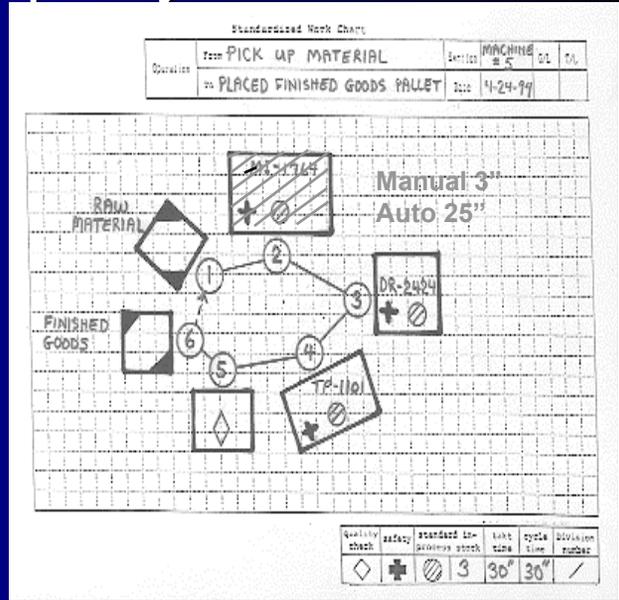


Standardized Work

The most efficient work flow - considering safety, quality, quantity and cost



Current Condition



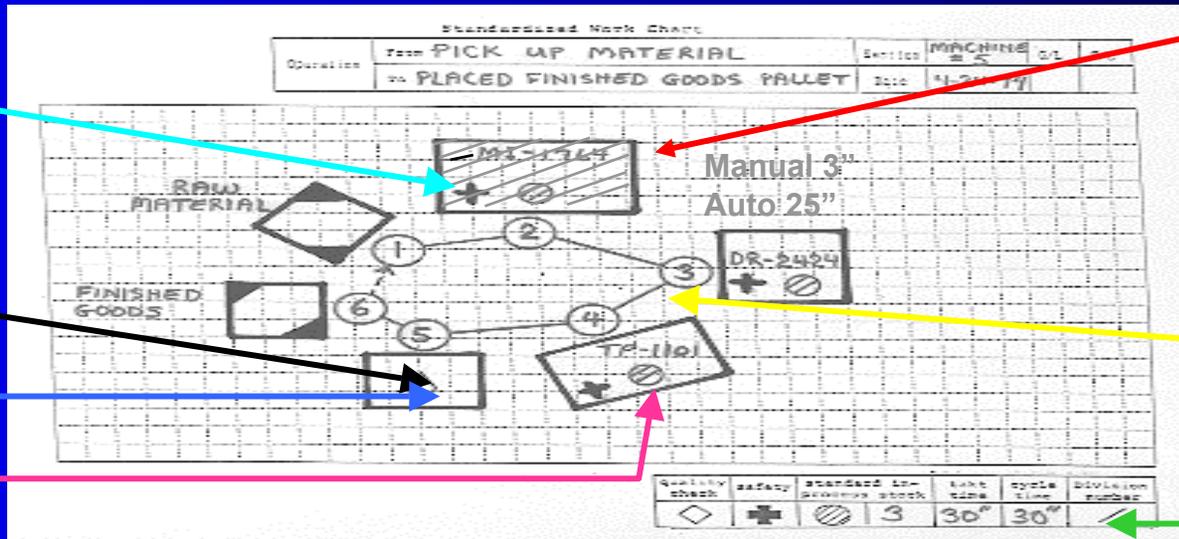
Standardized Work as the Window to True North

We say Physical and mental safety for people

This shows where we are applying

Physically - Safety guarding, procedures in place

Mentally – Team member confirmation of quality in their process



Kaizen
Shows where
Is my bottleneck

We say 0 defects; 100% value add; 1x1 on demand, in sequence

This shows where we are applying:

0 defects – Each team member confirming own quality

100% value add -- work flow is smooth, movement is minimized

-- cycle time = takt time

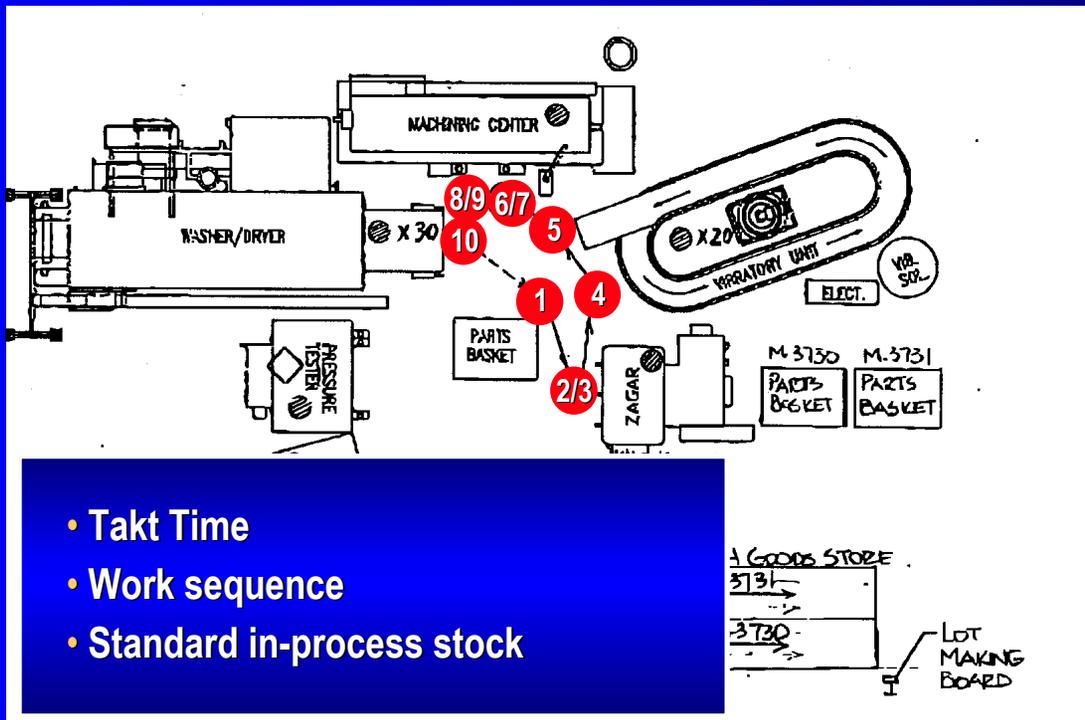
© 2002 Toyota 1x1 -- where and how many pieces of inventory in this process



Creating Standardized Work

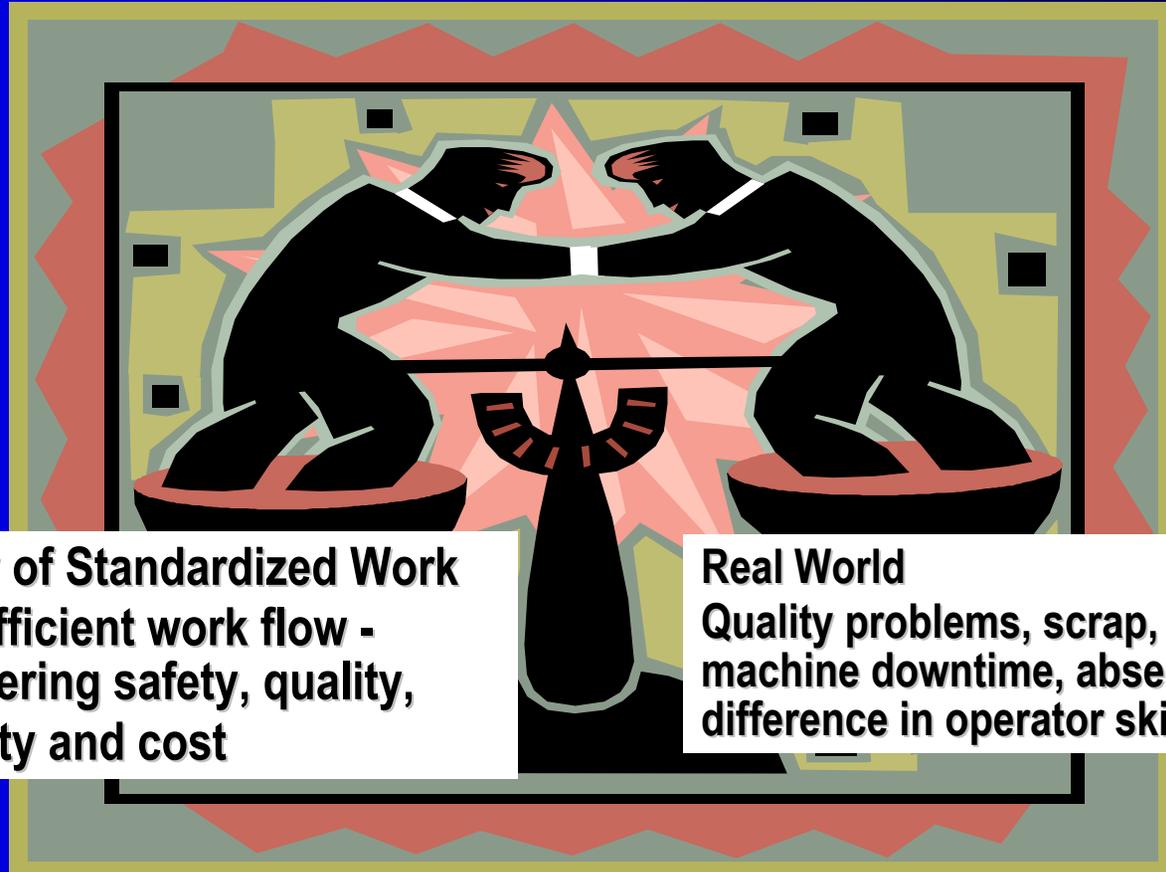
Most efficient work flow - considering safety, quality, quantity and cost

→ With the main consideration on human movement



How can I create work so that it can be repeated?

Creating Standardized Work

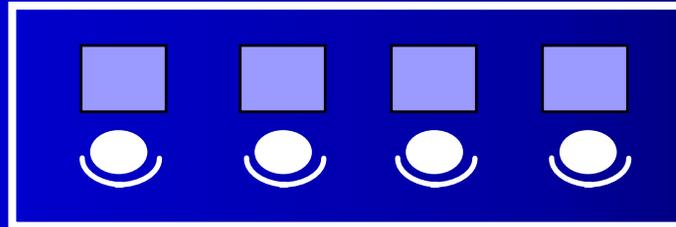


Theory of Standardized Work
Most efficient work flow -
considering safety, quality,
quantity and cost

Real World
Quality problems, scrap, fluctuation,
machine downtime, absenteeism,
difference in operator skill, hard work ...

**Leader must constantly strive overcome
“real world” problems to create the condition
for standardized work to happen**

Creating Standardized Work

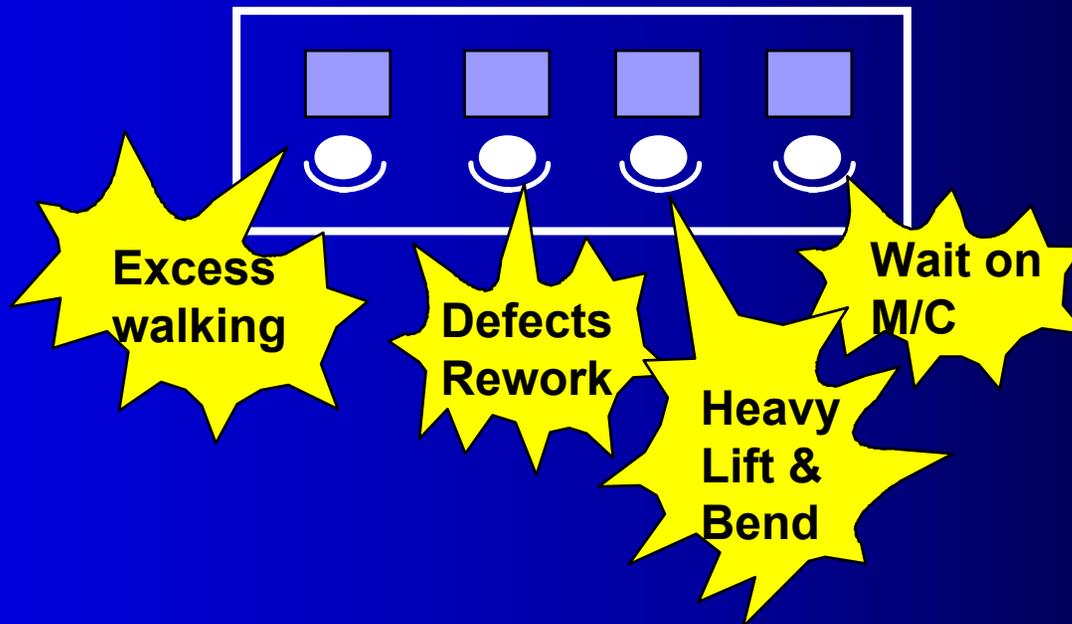


Baseline – Create the work standard

- How the part should be assembled
- What is ok/no good quality
- How to confirm ok/no good

Creating Standardized Work

1. Identify what is preventing the operator from the most efficient work flow – considering safety, quality, quantity and cost?

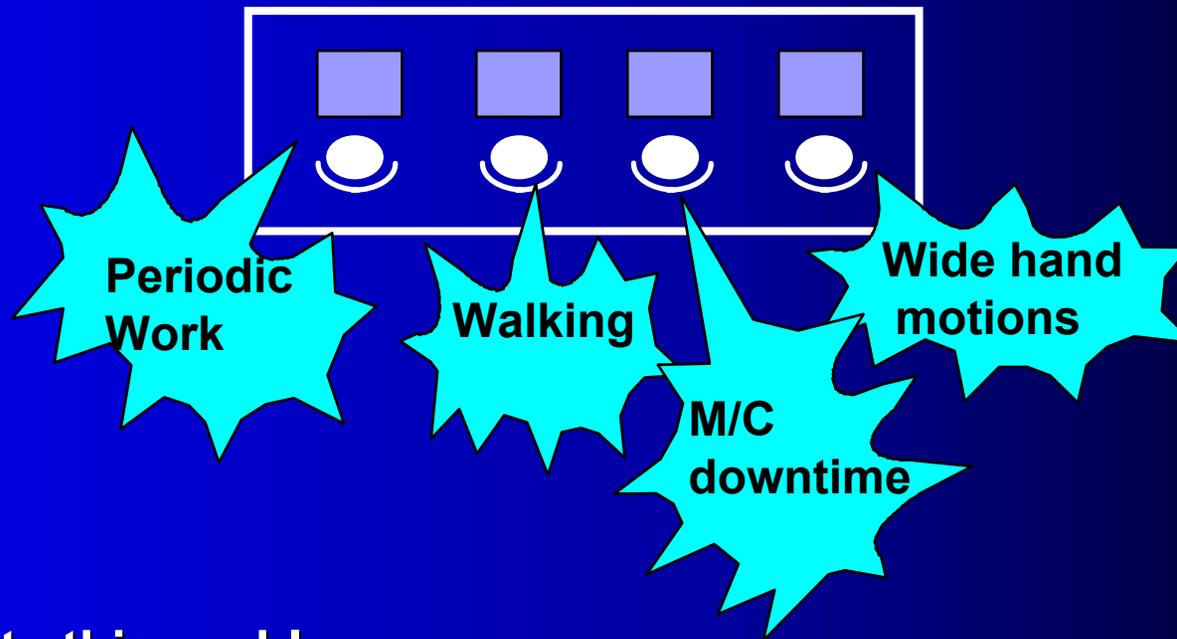


2. Eliminate this problem
3. Evaluate
4. Standardize the work



Creating Standardized Work

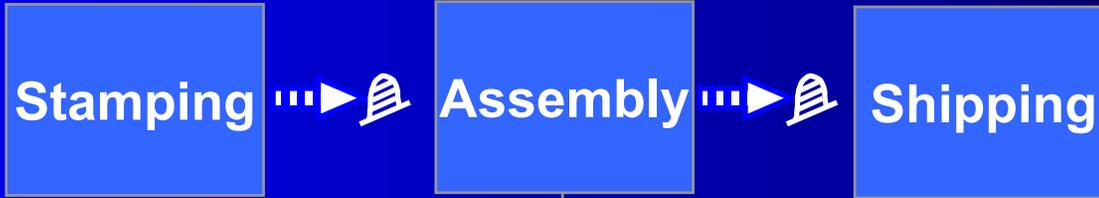
1. Identify what is preventing the operator from the most efficient work flow – considering safety, quality, quantity and cost?



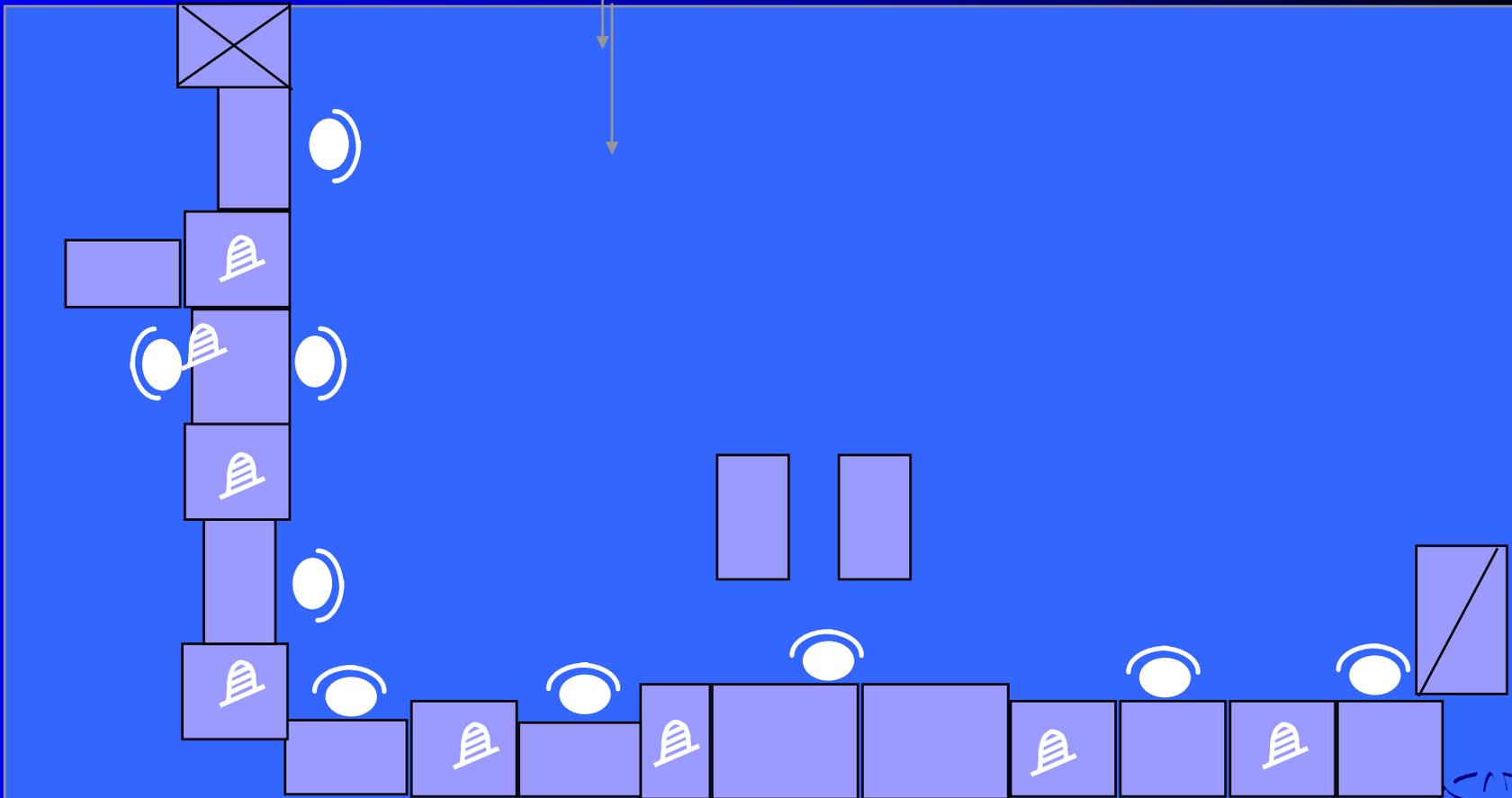
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Case Study Example

Process Flow:



Assembly Process:



Case Study Example – Creating Standardized Work

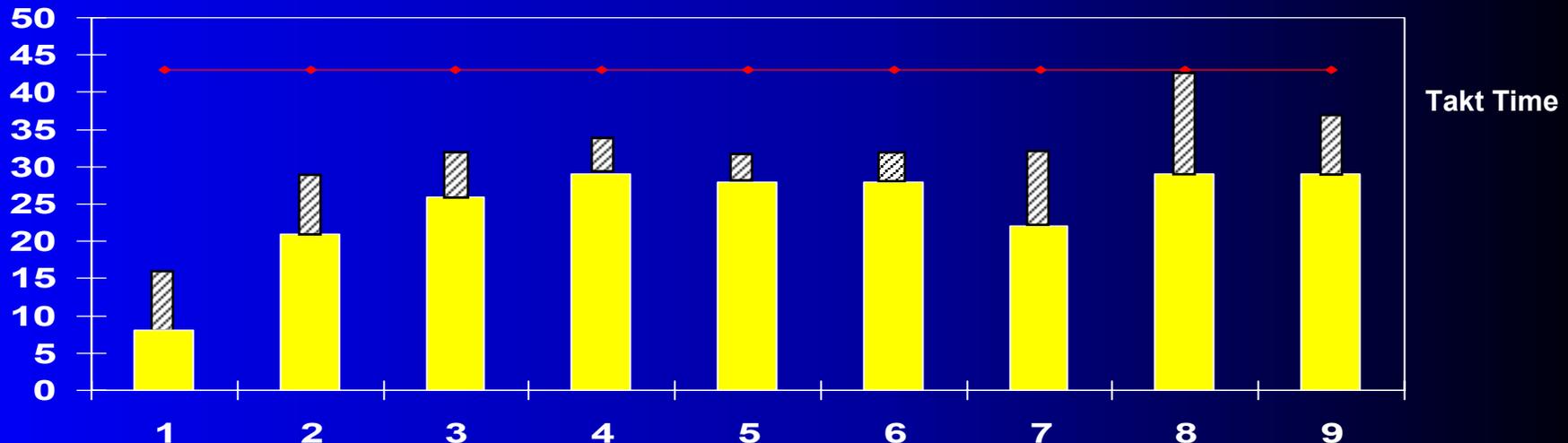
Questions to ask: Can the operators follow the most efficient work flow – considering safety, quality, quantity and cost?

Video:

Initial Condition – What is the biggest problem?



Cost ↑ -- Cycle time < Takt time



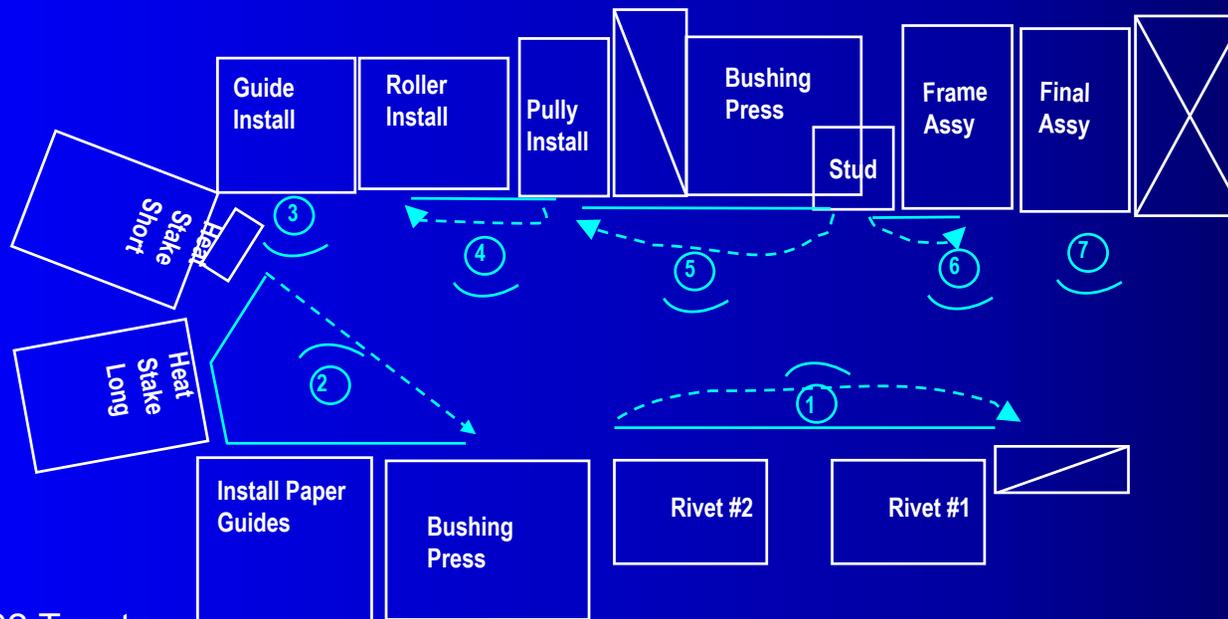
Actual 9 operator – $\Sigma CT 222'' = 5 \text{ ops}$

Case Study Example – Creating Standardized Work

Connect the operators to allow sharing of work

Video: Create 1 piece flow

- Connect all processes in sequence
- Remove sitting for operator flexibility
- Remove tables in between processes to minimize walk and location for inventory build
- Reduce width of work stations to minimize walk
- Rebalanced work to 7 operators



1 x 1 makes
more
problems
visible

Case Study Example – Creating Standardized Work

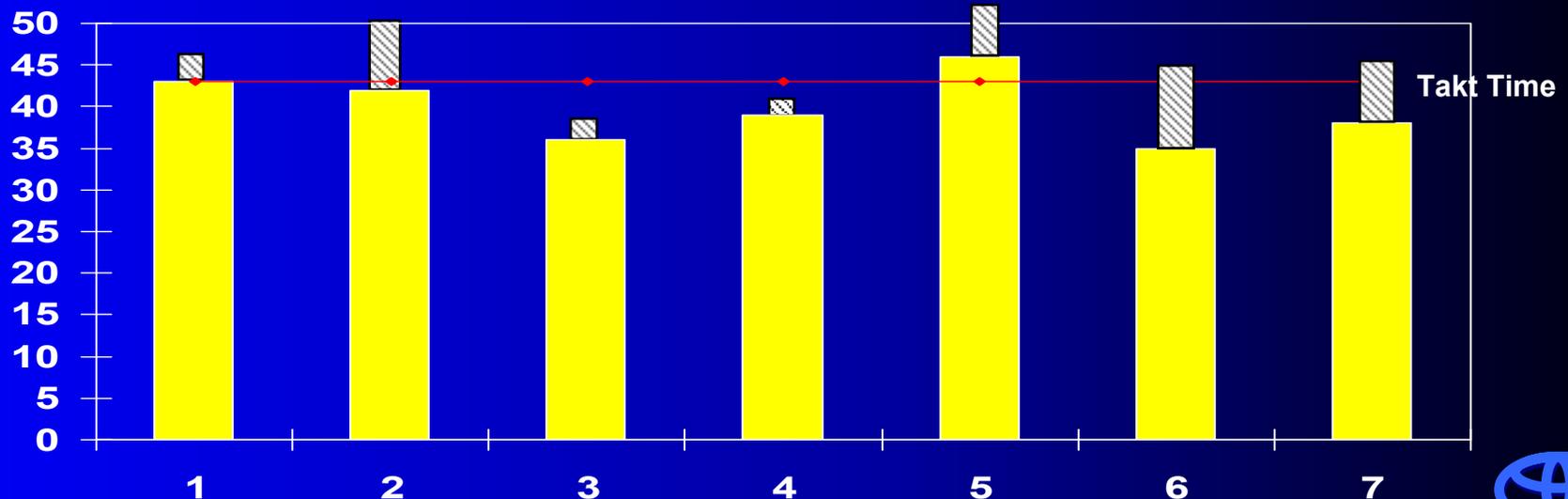
Questions to ask: Can the operators follow the most efficient work flow – considering safety, quality, quantity and cost?

Video:

After 1 piece flow – What is the biggest problem?



Operator # 5 CT > TT – can not meet output

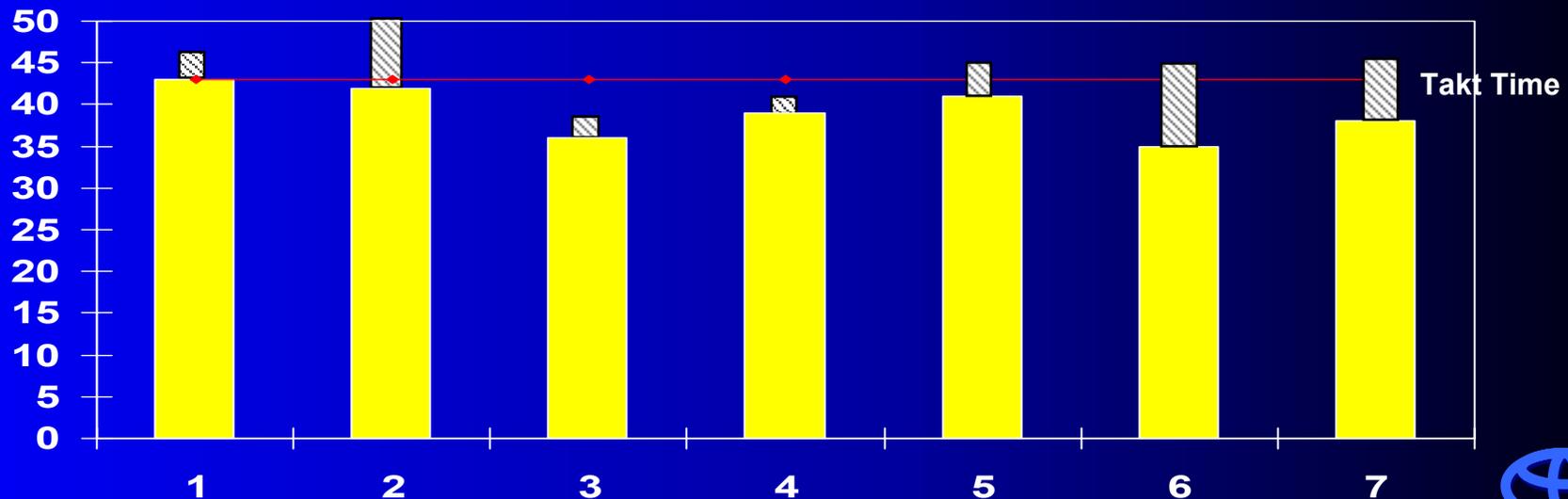


Case Study Example – Creating Standardized Work

Reduce waste in operators work

Video:

- Reduce empty walk
- Reduce reach for parts – parts at point of use
- Standard in process stock and transfer position with downstream operator
- Work while machine works
- Reduce double handling – auto part eject

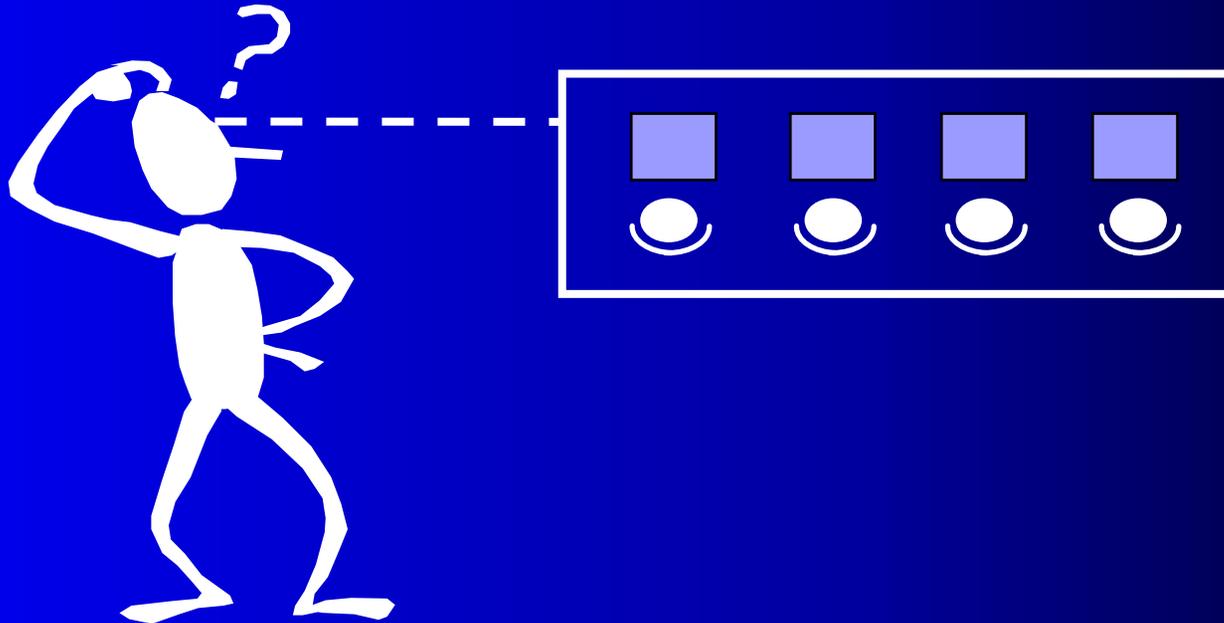


Making the System Connection

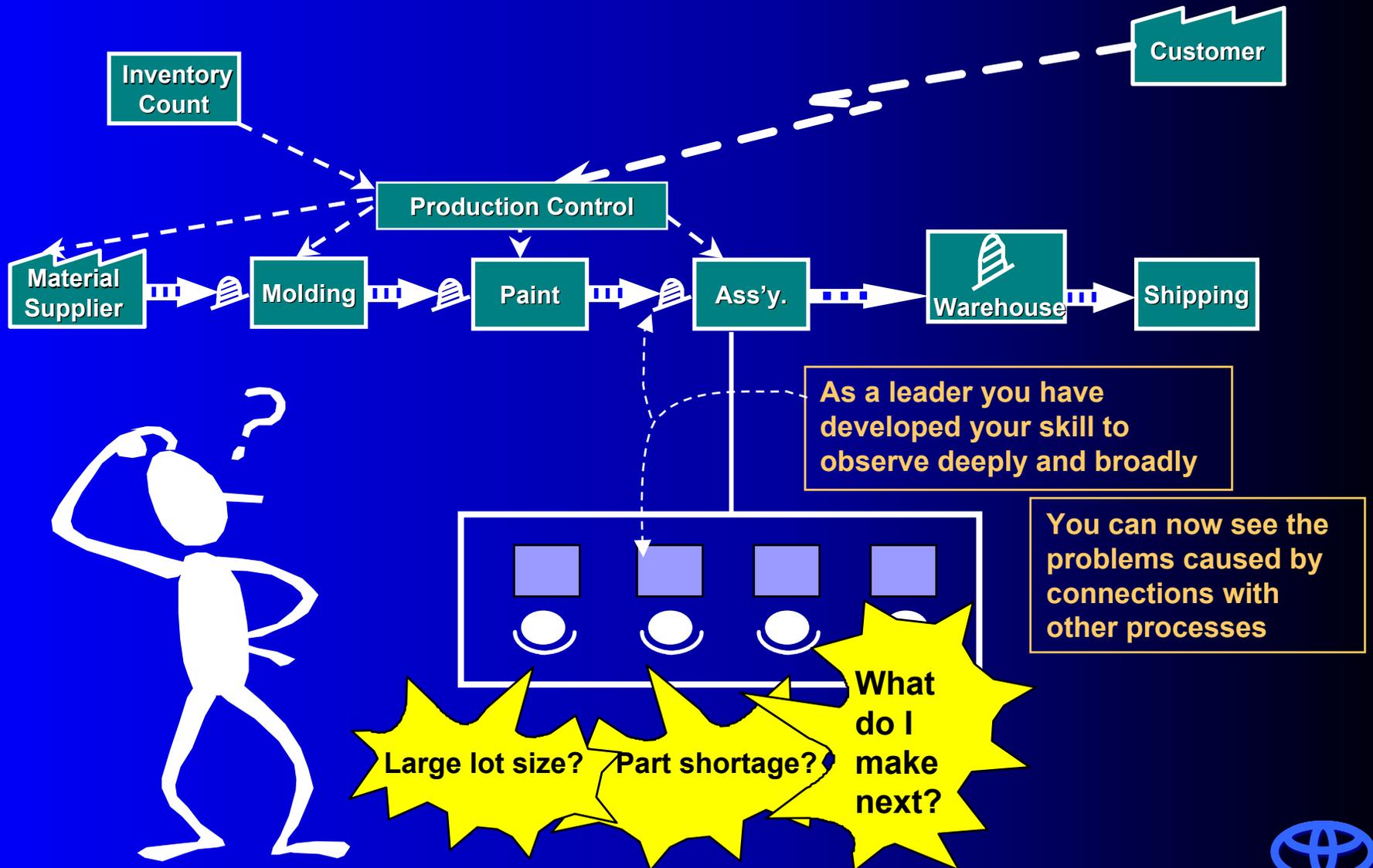
How can I make a better condition for standardized work?

-- Output impacted by:

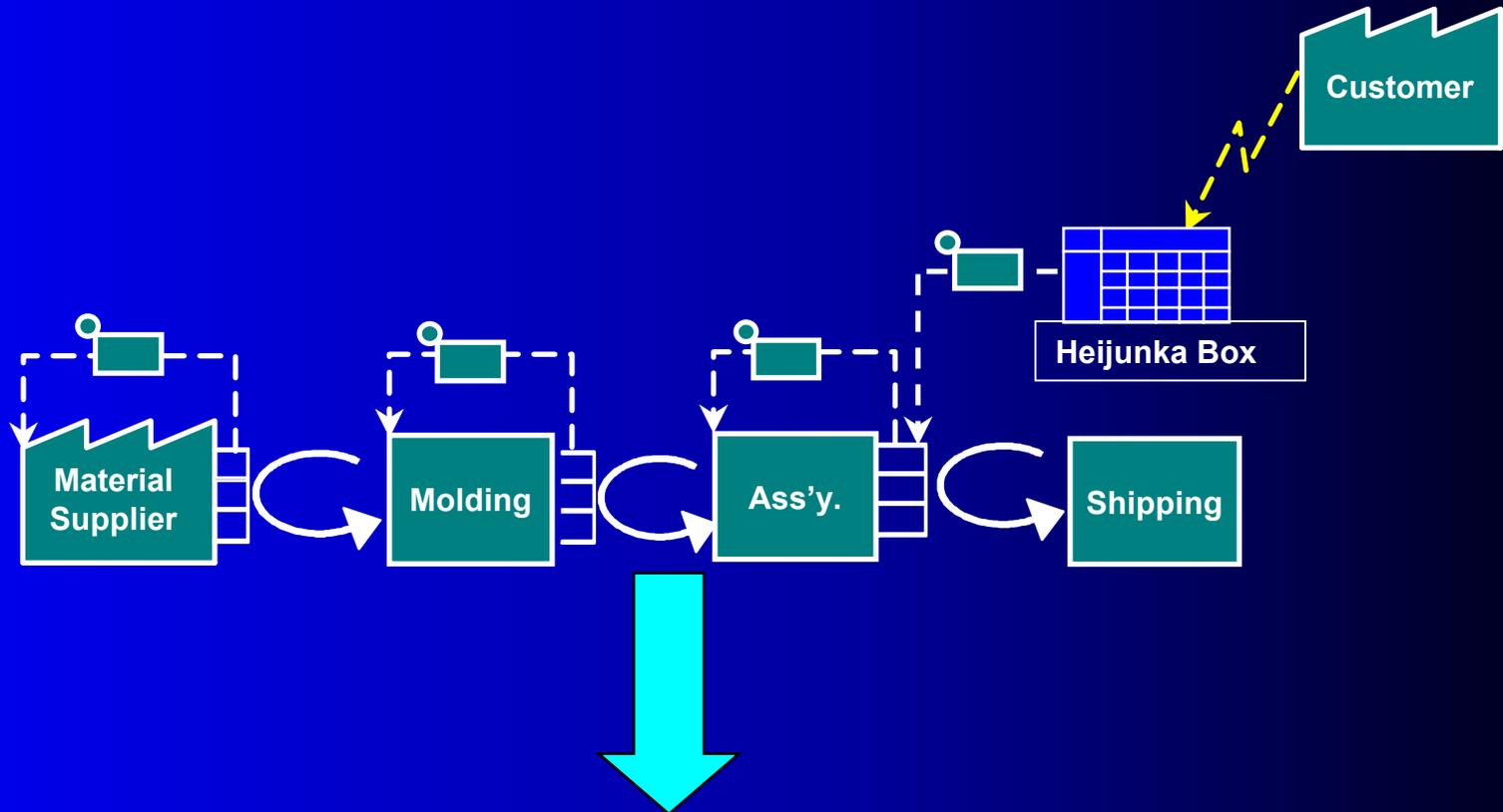
- part shortages
- high work content / lower work content parts
- Large containers from upstream causing downtime to changeover
- etc...



Making the System Connection



System Supports the Process



Creates the condition for the operator to produce what is needed, how many needed, when needed

Foundation to TPS – Heijunka, Standardized Work and Kaizen

Heijunka

**Standardized
Work**

Kaizen

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Heijunka

**Standardized
Work**

Kaizen

Leadership Characteristics for TPS



1. Think deeply

- Genchi Genbutsu
- Think deeply on what you see
Immediately try your idea

2. Do small and gradually

- Relating the manufacturing method to the people's work

3. Always question "What's next"

- Don't dwell on how much better we are
but how much farther we have to go