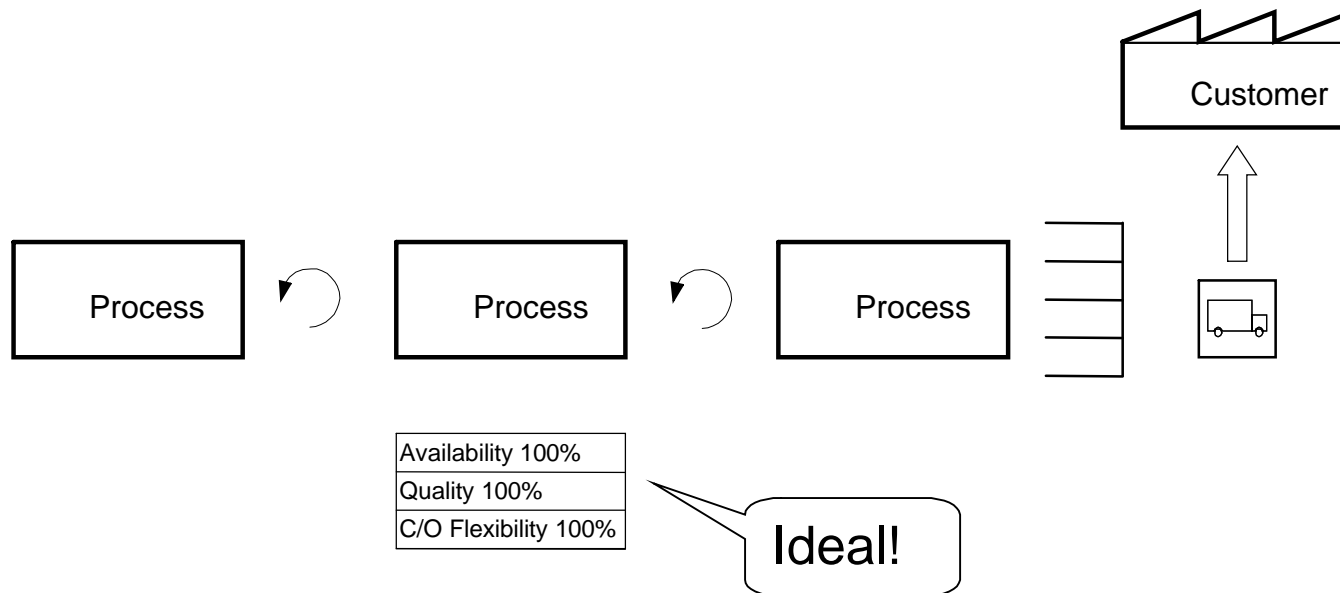


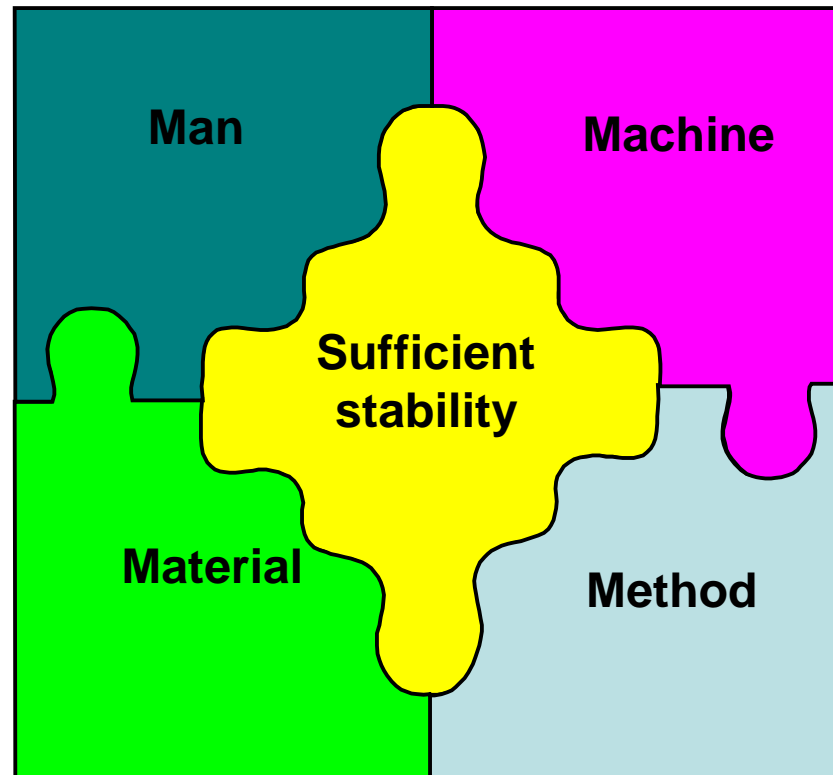
# The need for basic stability



## Typical implementation sequence



# Areas that we will discuss



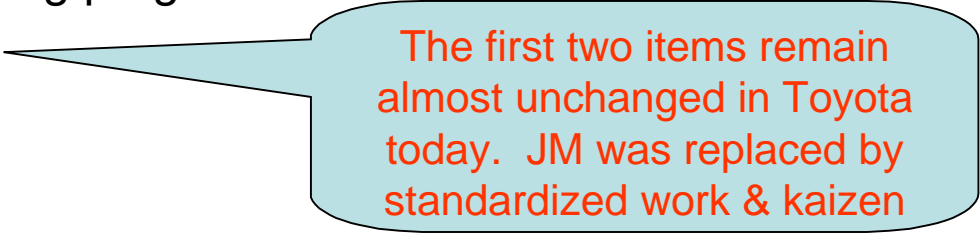
# Five expectations of a leader in manufacturing

1. Knowledge of work  
-(e.g. how we do things)
2. Knowledge of responsibility  
-(e.g. what we need to do by when)
3. Skill in improvement  
-(e.g. how can we do this better)
4. Leadership behavior & motivation  
-(e.g. why we do things this way)
5. Teaching ability  
-(how to pass along our skills to others)



# TWI History

- Established August 1940 by National Defense Advisory Committee
- Enacted by Presidential order in 1942 to become part of the War Manpower Commission
- TWI content was developed and supported by leading specialists, manufacturing companies, and union representatives
- TWI focused on producing safely, quickly, correctly, and conscientiously
- TWI was a supporting factor in winning WWII
- Transferred to Japan around 1950 as part of the occupation
- Managers and supervisors were coached in three core skill areas
  - Instruction
  - Improving
  - Leadership
- The original TWI basic training programs were
  - Job Instruction (JI)
  - Job Relations (JR)
  - Job Methods (JM)



The first two items remain almost unchanged in Toyota today. JM was replaced by standardized work & kaizen

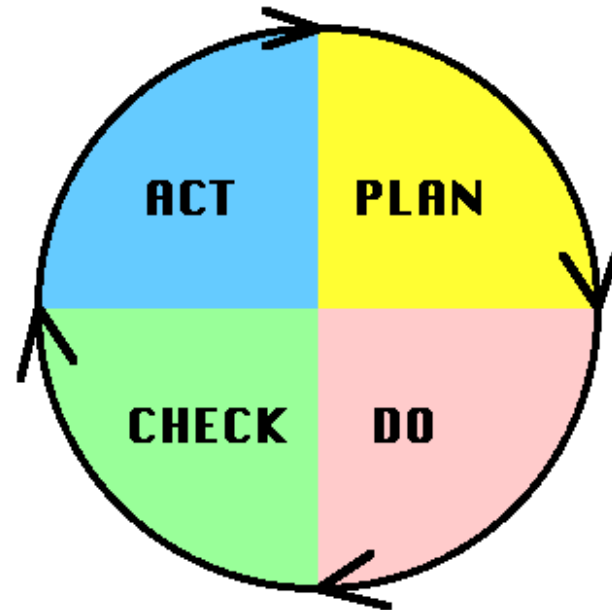
# The 4 Steps of Job Instruction

Step 1: Prepare the learner

Step 2: Present the operation

Step 3: Try out performance

Step 4: Follow up



There are about 16 separate sub-points within the above four steps. To master these steps in detail requires a 10 hour training class in Toyota. Most companies I visit think they have a good job instruction training program in place but when audited against the standard JI method it usually comes up very, very short...

# JR Outline

This course is based upon the notion that results are obtained through people and people must be treated as individuals.

The foundations for good relations in production are:

- Let people know how they are doing
- Give credit where credit is due
- Let people know in advance about changes that will affect them
- Make the best use of each persons ability

## The four steps of JR

- 1) Get the facts
- 2) Weigh and decide
- 3) Take action
- 4) Check results

# JM Outline

This course is based upon the need for supervisors to make the best use of manpower, machines, and materials in order to generate improvements.

JM focuses on improvement and always includes the help of those doing the actual job. Areas of focus include:

- Safety
- Materials
- Equipment
- Layout
- Other

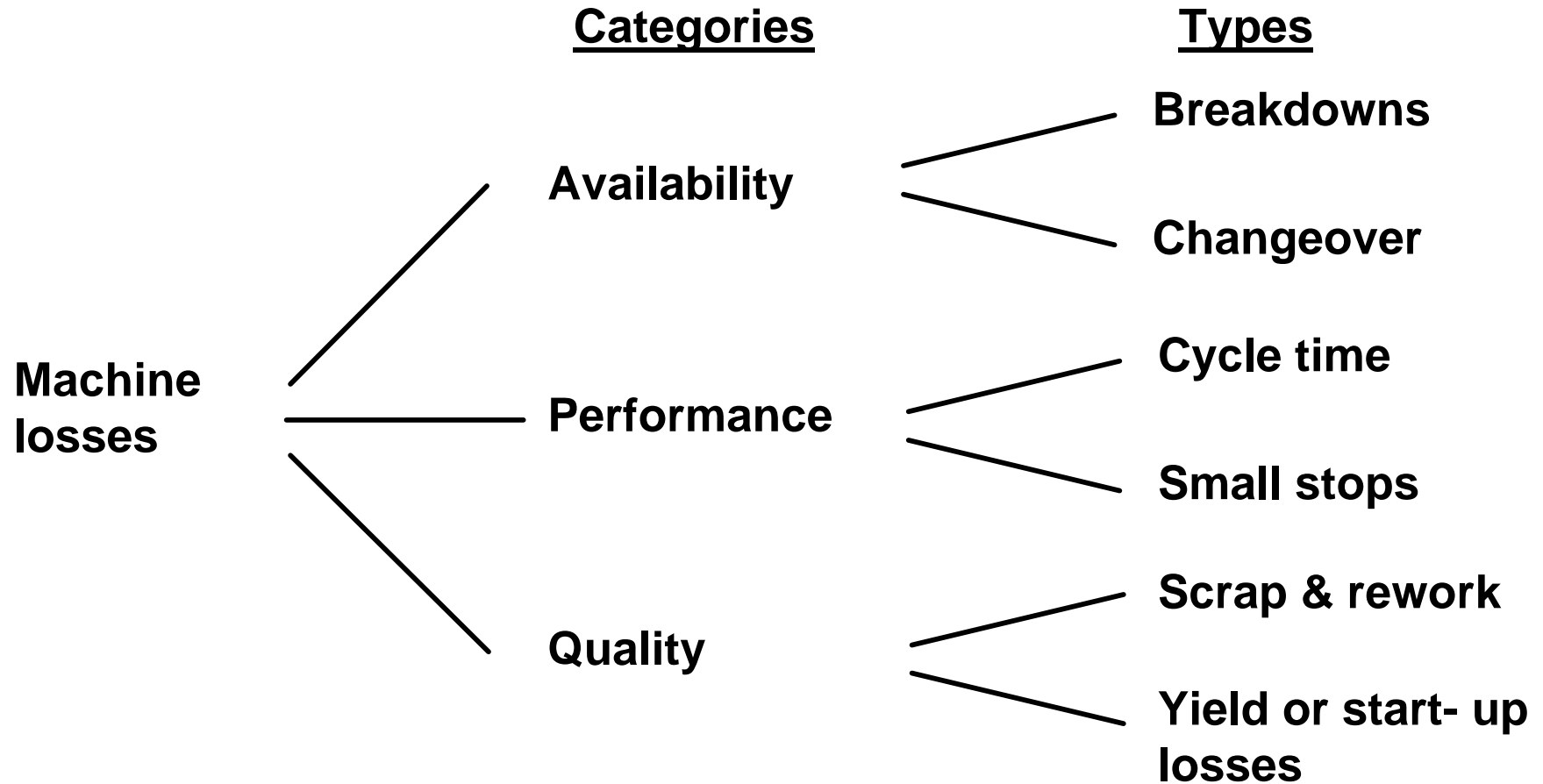
## The six steps of JM

- 1) Select the job or process
- 2) Analyze and record the steps
- 3) Examine key activities
- 4) Develop a plan for change
- 5) Install the best practices
- 6) Maintain and check results





# Six machine losses

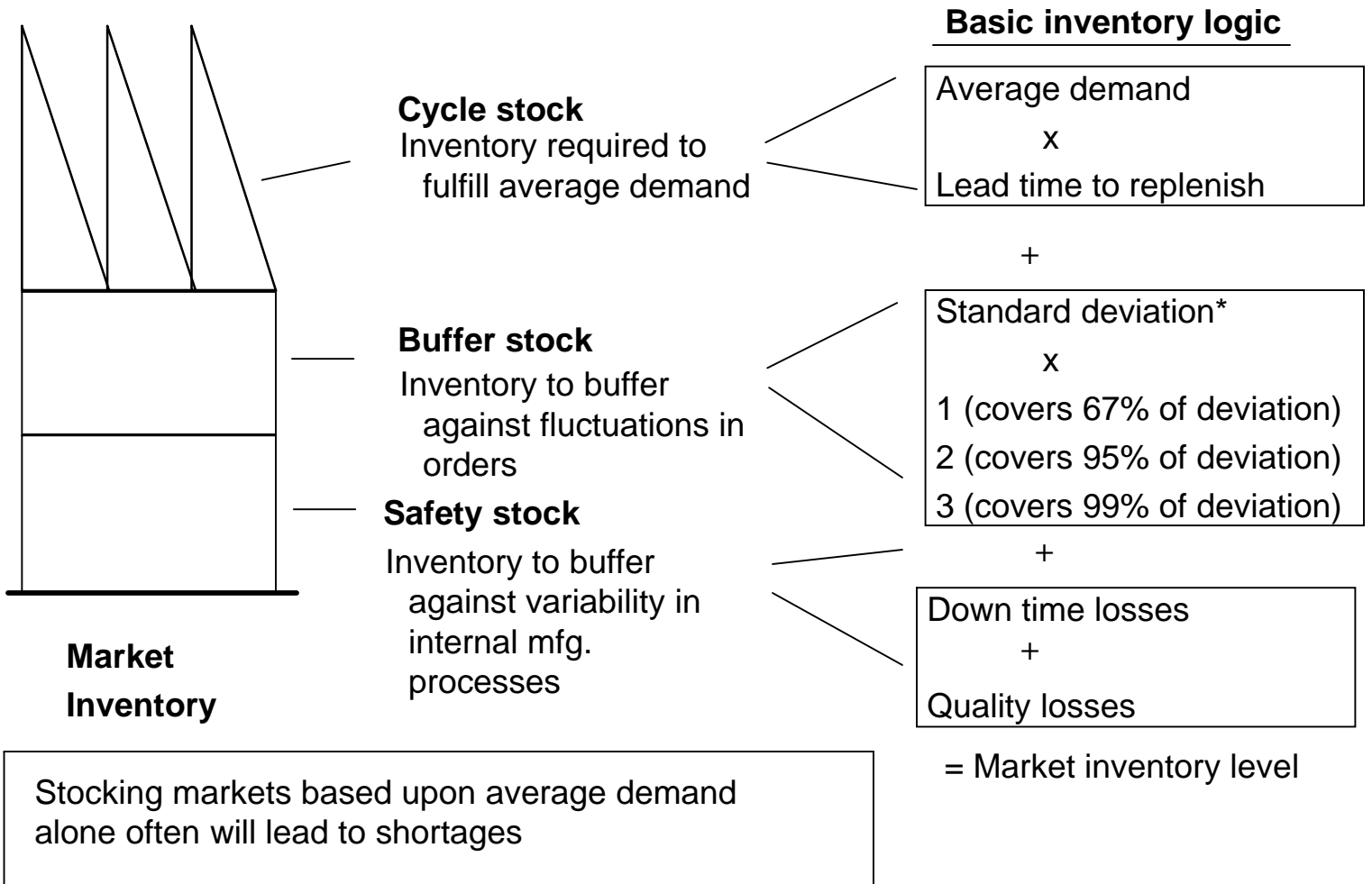


Note: Losses can be created by the other 3M's as well.

# Maintenance practices

Breakdown Maintenance BM	BM	<ol style="list-style-type: none"> <li>1) Temporary repair</li> <li>2) Breakdown repair</li> <li>3) Delayed repair</li> </ol>	<ol style="list-style-type: none"> <li>1) Minor stops</li> <li>2) Major breakdown</li> </ol>
Preventative Maintenance PM	PM	<ol style="list-style-type: none"> <li>1) Periodic Maintenance</li> <li>2) Preventative Maintenance</li> <li>3) Predictive Maintenance</li> </ol>	
	DM	<ol style="list-style-type: none"> <li>1) 5S</li> <li>2) Oil &amp; lubrication</li> <li>3) Tool checking</li> </ol>	
	CM	<ol style="list-style-type: none"> <li>1) Improvement to fixtures and jigs, etc.</li> <li>2) Modification of the machine</li> <li>3) Overhaul</li> </ol>	
	MP	<ol style="list-style-type: none"> <li>1) Standardization — Safety, ergonomics, etc..</li> <li>2) Value Engineering — MIR, MFR, MTBF, MTTF</li> <li>3) Project preparation — PM design</li> <li>4) Spare parts control</li> <li>5) Training — OJT and OFFJT training</li> </ol>	

# Inventory stocking logic



\*Assuming a normal distribution

# Focus on all documents not just one

## Methods of the Job (Operator)

- Job Instruction
- Standardized Work – 3 Forms
  - Process Capacity Sheet
  - Standardized Work Combination Table
  - Standardized Work Chart

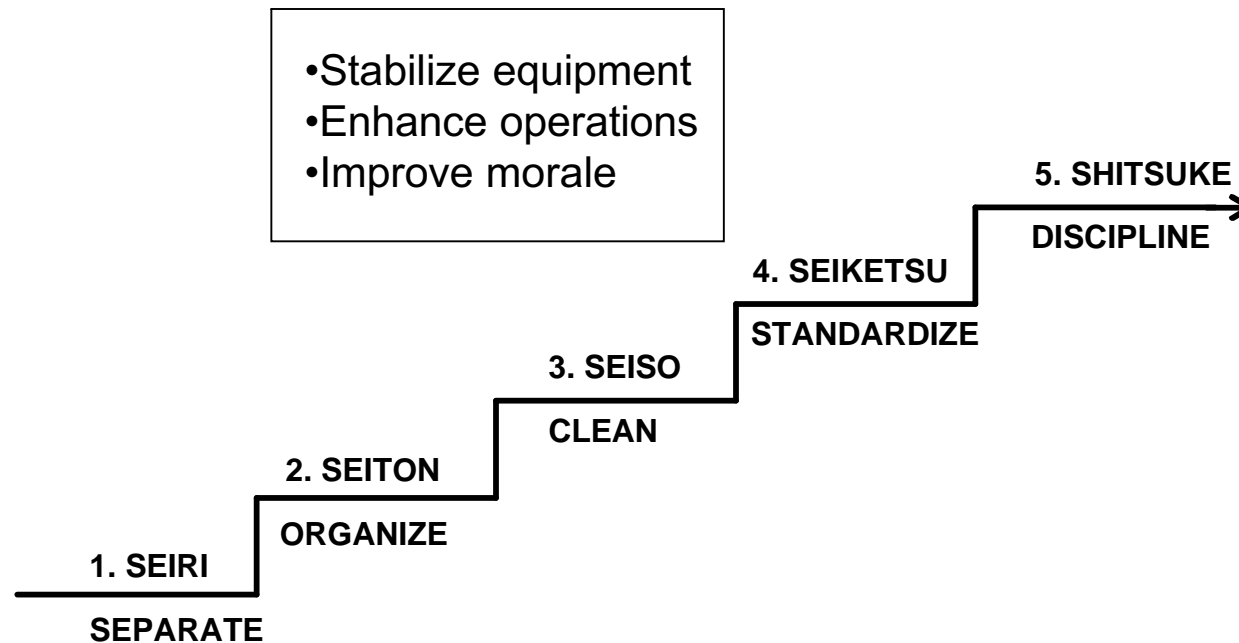
## Basis for the Process (Machine)

- Operation drawings
- Quality check sheet
- Tooling layout drawing
- Static accuracy chart (machine inspection sheet)
- Machine cycle charts

## Tools for Work (Kaizen)

- Time study sheets
- Work balance charts
- Motion analysis

# Five S process for improved stability



**Translation  
& Description**

**Separate** the necessary item from the unnecessary

**Organize** each item in its optimal position in the workplace

**Clean** thoroughly the relevant work items and the surrounding environment

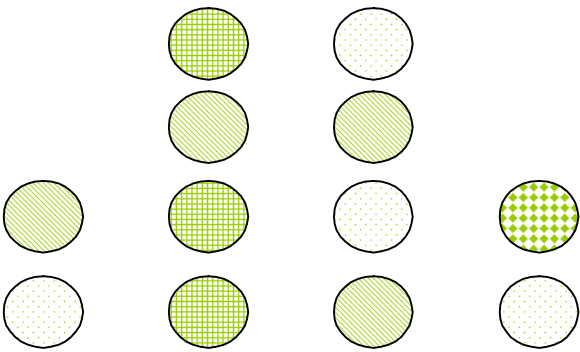
**Standardize** work procedures, checklists, etc. in order to maintain an orderly and clean work area

**Disciplined** application of the previous steps to maintain a cleanly work area

# Five S enables visual control

## No organization

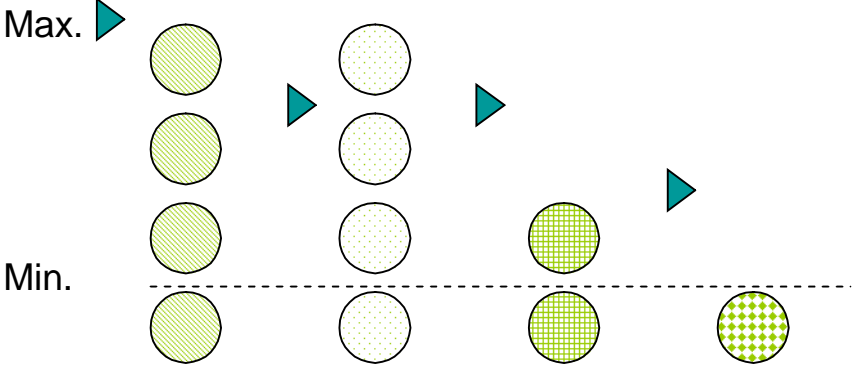
### Inventory



- Good or bad?? Unclear
- No standard or basis for comparison

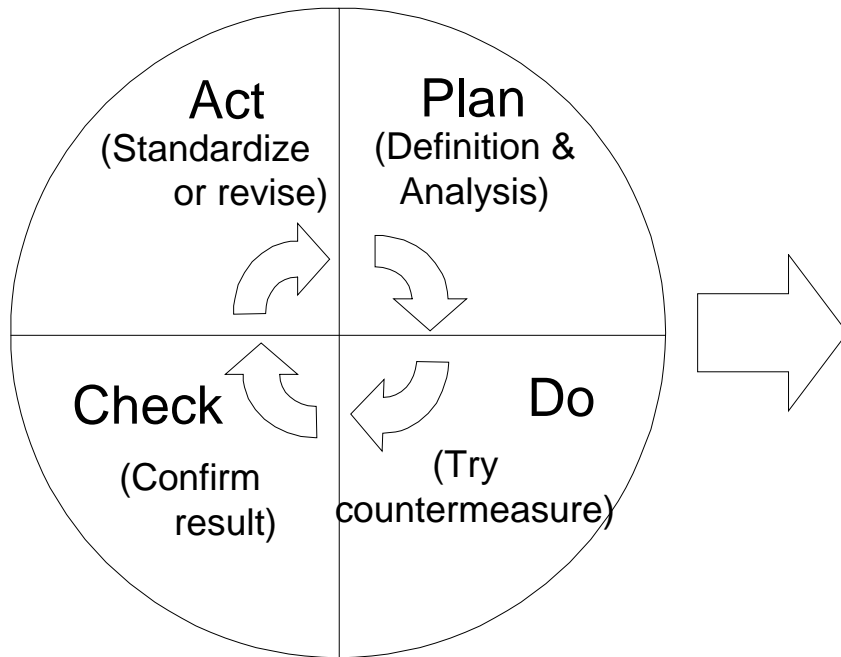
## Lean ideal

Type W	Type X	Type Y	Type Z
Min = 1	Min = 1	Min = 1	Min = 1
Max = 4	Max = 3	Max = 3	Max = 2



- Normal vs. Abnormal clear
- Standard basis for comparison

# PDCA Problem Solving



## Key Point:

**Constantly repeat the cycle as a problem solving tool and management routine**

**Toyota starting point for quality improvement in 1960's**

\*Originally known as the Shewart cycle developed by Walter Shewart in his 1939 book entitled "Statistical Methods From The Viewpoint of Quality Improvement" and later popularized by Edward Demming