

THE PROMOTION OF QC CIRCLE ACTIVITY

Sep. 11, 2019

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I Procedures for Quality Control

1. Procedures for Quality Improvement (1)

1. What is “Quality Improvement” ?

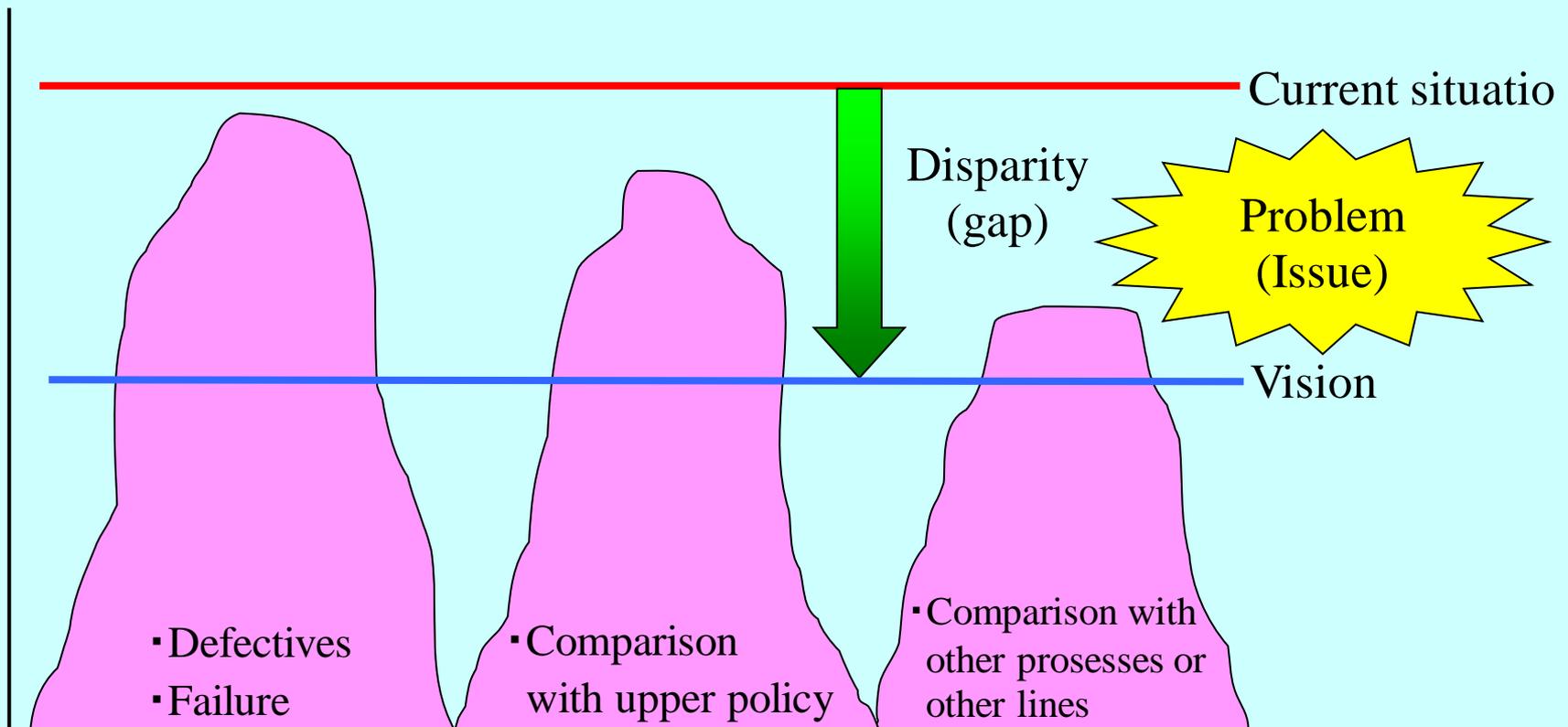
Improvement means taking some bad element and making it better. That means **in order to improve something, we must first clarify what is “bad” – that is where the problem is.**

▪ We could classify problems into two main types.

- ① The first is **a defect that occurs unexpectedly on a day-to-day basis;** because it was not expected, in most cases we do not have satisfactory data regarding the problem.
⇒ Improvements in these cases can be achieved more quickly through investigations focusing on the areas that are **different from what went before (i.e., changes).**
- ② The second type of problem comprises **chronically occurring defects,** or problems where goals, such as those listed in the business plan, cannot be achieved.
⇒ The fastest way to resolve this type of problem is to proceed to **the QC story.**

1. Procedures for Quality Improvement (2)

We defined a “problem” as a disparity (a gap) between “vision” and “the current situation”. It is therefore important to express “vision” and “the current situation” in quantitative terms.



1. Procedures for Quality Improvement (3)

2. Attitude in Approaches to Quality Improvement

① Sense of responsibility with regard to Quality Assurance

It is an embarrassment to the workplace to send a defective part to a subsequent process.

② Stick to it

Chronic defects in particular are areas in which improvements are not easily realized.

We must maintain a strong will and stick to it.

③ Originality

We need **original ideas** to approach the problem from a new point view.

④ Marshaling the wisdom of the group

There is not doubt that **the total knowledge of the group will bring greater results than the knowledge of a single individual**. Part of the supervisor's role is to bring out the strengths of his group.

⑤ Ties with related divisions

By going to subsequent processes or prior processes to investigate defective **phenomena**, we can obtain many useful hints with regard to improvements.

1. Procedures for Quality Improvement (4)

3. How to Obtain

(1) Categorizing data

① Continuous data

- This is data derived from any type of measurement (length, weight, time, temperature, etc.).

② Enumerated data

- This is data derived from any counting of elements (defect count, number of foreign materials, etc.).

③ Descriptive data

- This is information that can be expressed in words.

(2) Clarifying the goal, and obtaining data suitable to that goal

- The most important thing in obtaining data is to clearly indicate the reason for obtaining the data and how the data will be used.

(3) Cautions when obtaining data

- #### ① By clearly indicating the conditions under which the data was obtained, we can make comparisons to other data later on.

- #### ② When taking measurements of a number of samples derived from a large number of parts, arrange the samples to be taken from among all available parts so as to avoid bias (i.e., random sampling).

- #### ③ In case of data regarding defects, when the causes and the phenomena can be divided into various layers or “strata”, make an effort to obtain data in a stratified format as well.

1. Procedures for Quality Improvement (5)

4. How to Summarize Data

(1) Applying QC methods

Applying QC methods is an effective way of doing this.

7 QC tools (sometimes called “Q7”), 7 New QC tools (sometimes called “N7”), etc.

① Pay close attention to variations in individual data and to time-related trends

② Stratify and compare data

“Understanding by stratification ”

③ Using simple methods freely and effectively 90% of problems at the work site can be solved using simple methods.

(2) Grasping the facts from the data

If the processes of gathering and analyzing the data are correct, then the facts derived from the data will be also be correct.

(3) Summarizing the data

① How to locate the center point of the data : mean (\bar{x}), median (\tilde{x})

② Determining the degree of dispersion : standard deviation (σ), Range (R)

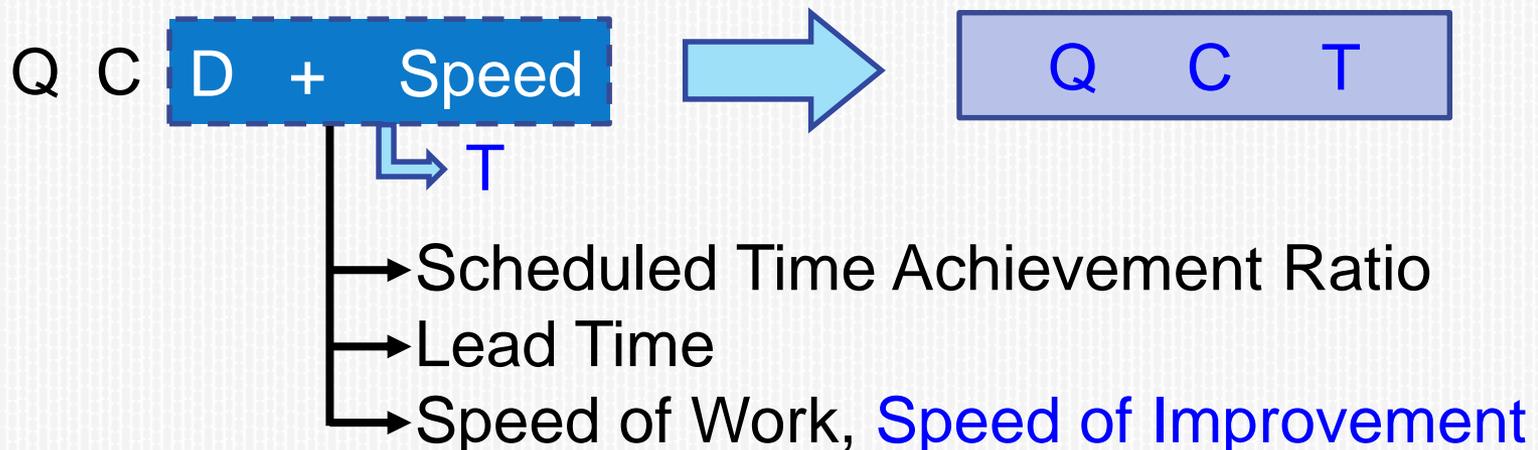
1. Procedures for Quality Improvement (6)

5. Evaluation Tool for Production Way; from QCD to QCT

Up to now, the competitiveness index of manufacturing has been penetrated by “Q (quality), C (cost), D (the date of delivery)”, but more than before, “scheduled time achievement ratio”, “lead time“, and “acceleration of work for breakthrough” has been emphasized, and the importance of recognition for "time" is increasing more and more.

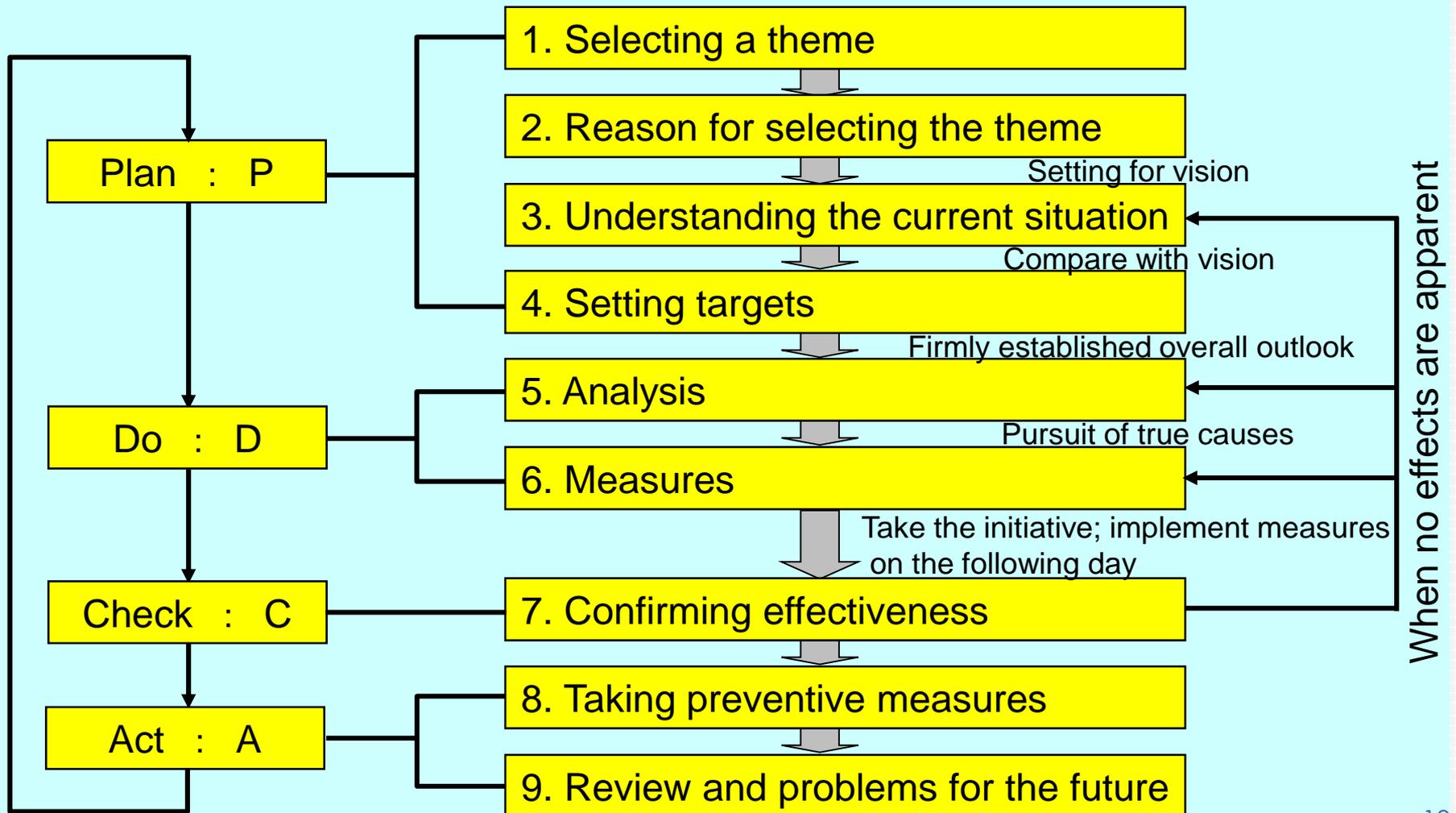
Therefore, instead of the conventional “D”, the concept of “T” (time) which added speed (speed) to “D” has been set. It is required that each individual practice work that is conscious of "time" and accelerate activities.

That is, if the improvement speed is fast, the effect can be issued more quickly, and the QCC activity is effective for speeding up the improvement.



2. Improvement Procedures Based on the QC Story (1)

1. "Cause Pursuit" QC Story



2. Improvement Procedures Based on the QC Story (2)

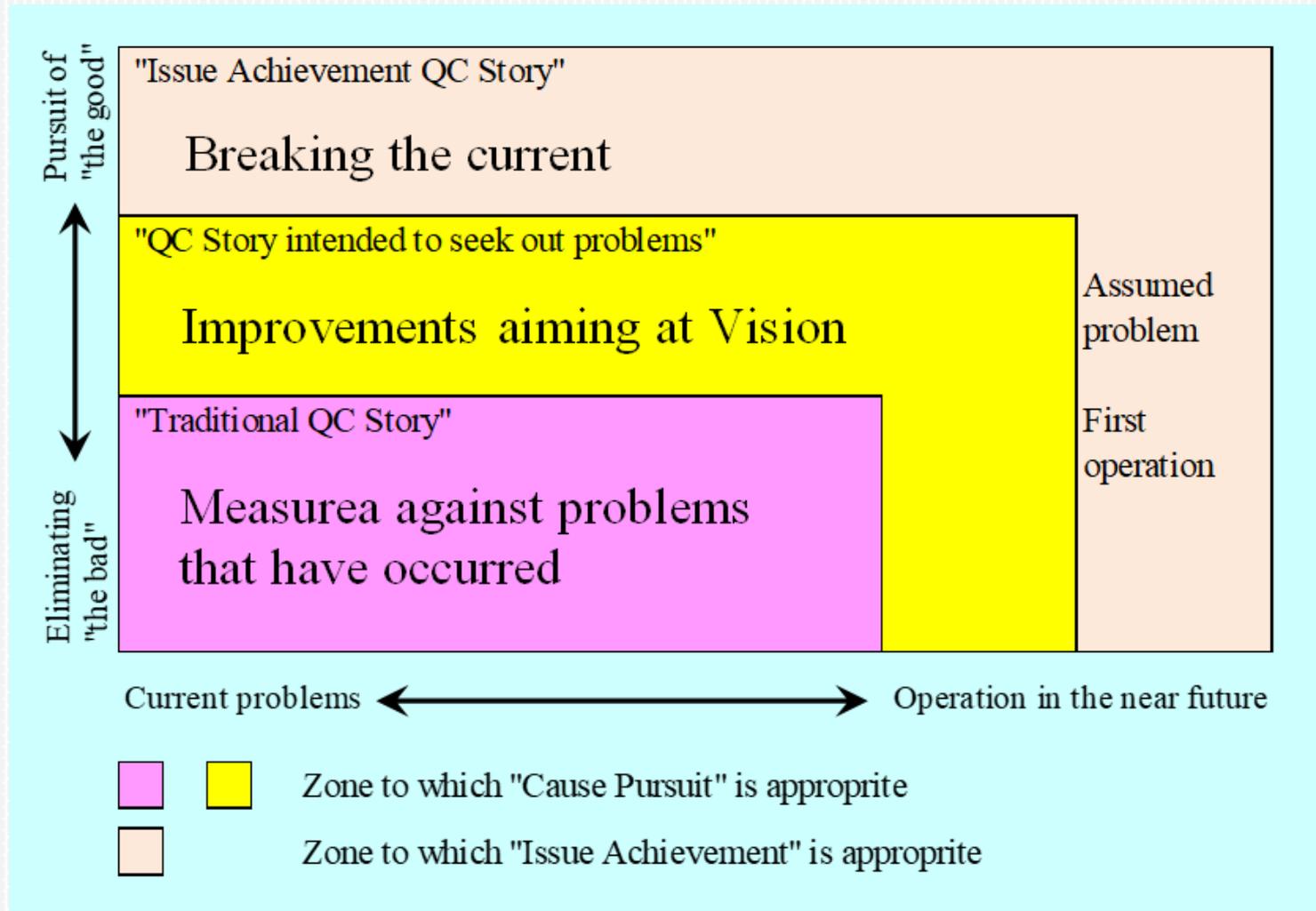
2. “Issue Achievement” QC Story

(1) What is the “Issue Achievement” QC Story?

- ① Purpose and targets are defined, but negative elements are not clearly visible.
- ② Purpose and targets are defined, but conversion to data is difficult.
- ③ The aim is to achieve a substantial level increase, but the desired level cannot be reached using only measures against the current negative circumstances.
- ④ The aim is to achieve attractive quality or an attractive circumstances.
- ⑤ At the start of a work process (operation), a comparison with the past is not possible.
- ⑥ The aim is to stamp out a problem that seems likely to arise in the near future before it actually occurs.

2. Improvement Procedures Based on the QC Story (3)

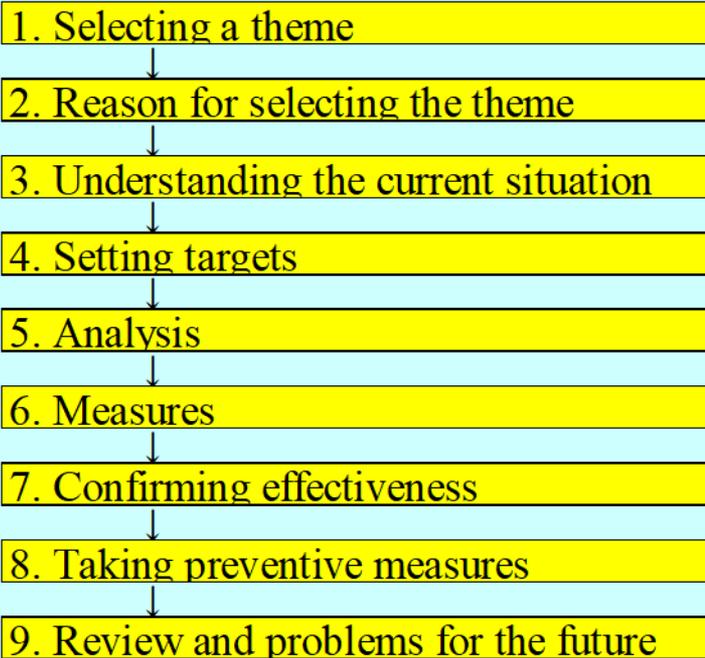
(2) Concepts in suitable applications of Cause Pursuit vs. Issue Achievement



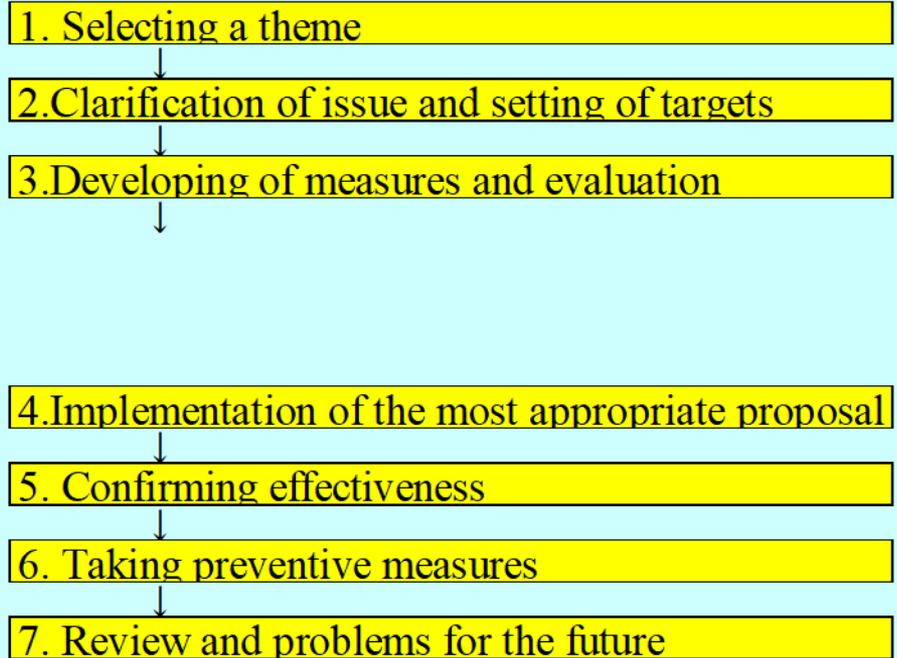
2. Improvement Procedures Based on the QC Story (4)

(3) Comparison of QC Story between “Cause Pursuit” and “Issue Achievement”

Cause Pursuit:



Issue Achievement:



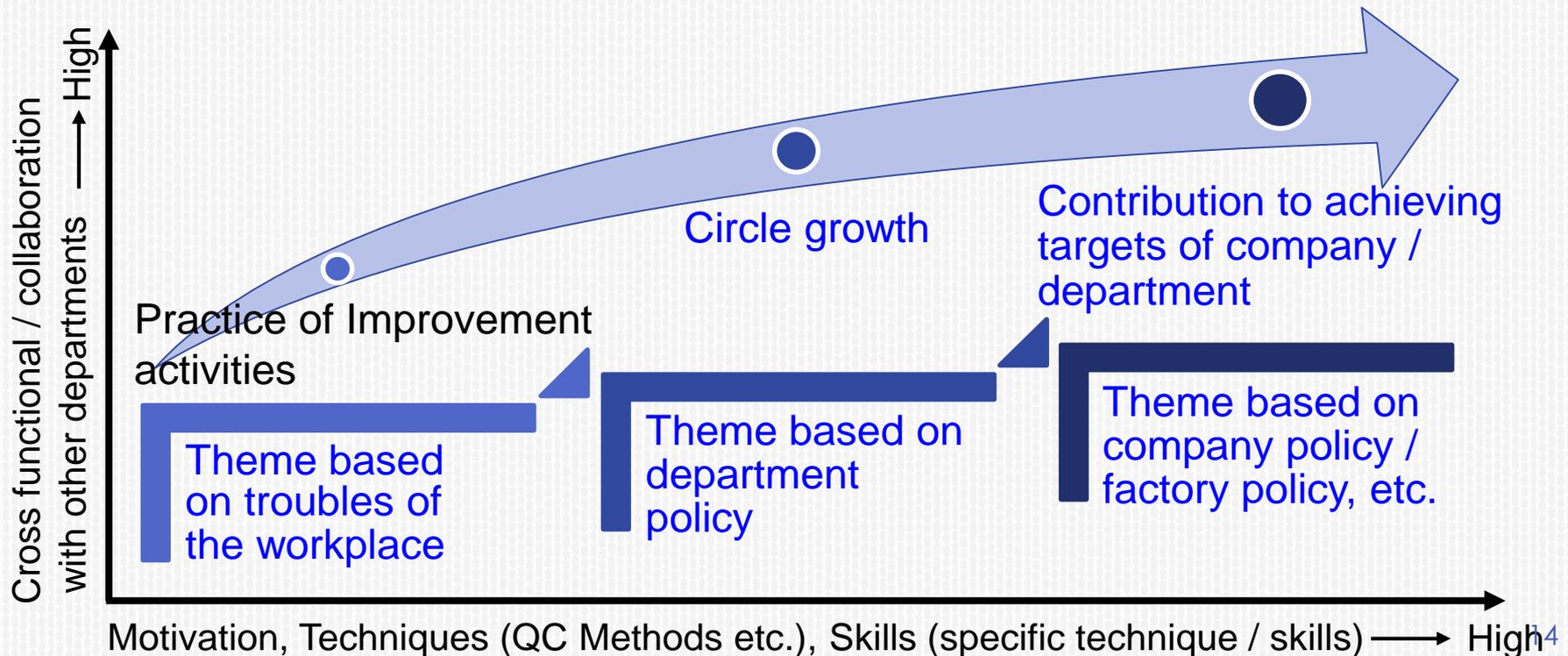
The Issue Achievement QC Story enables us to grapple with unknown and difficult-to-quantify problems, and to extend good elements by pursuing them in the process those are the characteristics of the Issue Achievement QC Story. Therefore in comparison to the traditional Cause Pursuit QC Story, there is no “Analysis” step; this is considered to be merits and demerits.

The Cause Pursuit QC Story is always the base, if the Issue Achievement QC Story used resourcefully, however it can be an extremely effective tool in terms of challenging a variety of new themes in the future.

2. Improvement Procedures Based on the QC Story (5)

(4) Selecting a Theme

It is better for the beginner circle to initially select a theme from the " troubles of the workplace " and to improve it. At that time, **the circle needs to make efforts to learn and use the 7 QC Tools firmly and improve its skills.** And with the growth, it would be best if the circle could select and improve the theme based on the top policy (company problem) and contribute to the company.



3. QC Methods

✓ The 7 QC Tools and The 7 New QC Tools

90% of problems at the worksite can be solved using the 7 QC Tools.

© mark indicates the situations in which the tools are commonly used.

Method Name	Outline	Situations in which the tools are applied
Stratification	*Divide data and investigation results into separate items (by job shift, machine, part, etc.) Through stratification, we are able to locate common elements and trends.	©Used to locate the problem point (the negative element).
Checksheet	*A record sheet devised so that data can be summarized and easily organized through a simple check.	○Used to obtain and organize data easily. ○Used to leave a record of inspections.
Pareto chart	*A chart that divides such factors as number of defects or faults, claims, accidents, or costs into categorized items such as "phenomenon" or "cause" size) a	©Used to extract an important problem from among a number of problems at the worksite, and narrow down the targets of

© mark indicates the situations in which the tools are commonly used.

Method Name	Outline	Situations in which the tools are applied
Relation diagram	*Using arrows, the diagram presents theoretically the relationship between problems and the factors that affect them.	©Used when the aim is to clarify large, vague problems or problems in which many elements are intricately mixed together.
System diagram	*A "tree diagram" that gives more detailed breakdown of methods intended to achieve a certain goal.	©Used when the aim is to draw out specific policies in relation to a certain problem. ○Used to illustrate the relationship when the cause of a problem (negative element) can be explained using a physical mechanism.
Matrix diagram	*A diagram that illustrates the relationship among more than two elements.	©Used to investigate the relationship among more than two elements, to correctly grasp the overall relationship, and to seek out the location of the problem point.
Arrow diagram	*A flow chart that is drawn up, after considering promotion of work and operational procedures, to establish the optimum schedule or analyze processes. This diagram is intended to assist in efficient plan management.	○Used when establishing a schedule for areas of operation with complex interrelationships, or when establishing detailed schedules.
PDPC method	*This flow chart illustrates, using a series of arrows, the measures that should be taken against changes in the work situation, and each stage of those changes.	○Used when the aim is to establish a plan to try a series of methods one after another with the intent to resolve a problem. In particular, used when information is insufficient, and when the situation is unstable and the information unreliable and difficult to predict.
Affinity diagram	*This diagram summarizes verbal data such as facts, opinions, and ideas based on the affinity (similar in meaning to interconnectiveness) among the various types of data.	©Used when the aim is to summarize vague problems--such as those expected to arise in the future or those which up to now have been difficult to investigate--and at the same time to discover the specific problems that should be solved.
Matrix data analysis	*A method of organizing large volumes of data, and obtaining a conclusion with a positive outlook.	○Used when the aim is to illustrate the relationship among three types of data (3-D) in an ordinary scatter diagram (2-D).

4. Relation Matrix Diagram between QC Story Steps and QC Methods

✓ Frequency Used QC Methods in QC Story Steps

Methods \ Step		7 QC Tools (Q7)							7 New QC Tools (N7)							
		Pareto chart	Cause and effect diagram	Histogram	Checksheet	Graphs	Scatter diagram	Control chart	Stratification	Relation diagram	Affinity diagram	System diagram	Matrix diagram	Arrow diagram	PDPC method	Matrix data analysis
P	Selecting a theme	⊙		○	○	⊙	○	⊙	○	○		○				
	Reason for selecting the theme															
	Understanding the current situation	⊙		⊙	○	⊙	○	⊙	⊙		○					
	Setting targets					⊙		⊙					○			
D	Analysis	⊙	⊙		○		⊙		○	⊙		⊙	○		○	○
	Measures		○		○						○	⊙	○		○	
C	Confirming effectiveness	⊙		○		⊙		⊙								○
A	Taking preventive measures				○	○		○								
	Review and problems for the future															

II 7 QC Tools

1.7 QC Tools

✓ Outline of 7 QC Tools

⊙ mark indicates the situations in which the tools are commonly used.

Method Name	Outline	Situations in which the tools are applied
7 QC Tools (Q7)	Stratification *Divide data and investigation results into separate items (by job shift, machine, part, etc.) Through stratification, we are able to locate common elements and trends.	⊙Used to locate the problem point (the negative element).
	Checksheet *A record sheet devised so that data can be summarized and easily organized through a simple check.	○Used to obtain and organize data easily. ○Used to leave a record of inspections.
	Pareto chart *A chart that divides such factors as number of defects or faults, claims, accidents, or costs into categorized items such as "phenomenon" or "cause", and expresses these factors using a bar graph (arranged in order of size) and a line graph (showing the cumulative ratio).	⊙Used to extract an important problem from among a number of problems at the worksite, and narrow down the targets of improvements. ⊙Used when estimating which factor it would be most effective to attack in terms of the problematic results (characteristics). ⊙Used when confirming the effects before and after improvements.
	Cause and effect diagram (fishbone) *A chart that organizes the relationship between the problematic characteristics (the results) and the factors that effect them (supplementary causes), and summarizes these elements systematically in a "fishbone" pattern.	⊙Used during brainstorming when isolating the candidates for causes (factors) that are currently creating the negative elements in the problematic results (characteristics). ○Used when isolating policies in relation to new issues.
	Histogram *A chart that illustrates a large volume of data with variations in an easy-to-read bar graph.	⊙Used when the aim is to grasp whether the process itself is stable or not, or when the aim is to grasp the capabilities of that process in comparison to standards and numerical standards.
	Graphs *Data is expressed graphically to allow comparisons in size or the passage of time, and at the same time clearly illustrate changing conditions.	⊙Used when the aim is to draw attention, to arouse interest, or to explain the problem in terms that are easy to understand.
	Scatter diagram *A graph intended to show the inter-relationship between two corresponding sets of data.	⊙Used when the aim is to verify whether that factor truly has significant effects, after certain factor is given by using Cause and Effect diagram. ○When controlling another factor (substitute characteristic) to obtain an expected results, this tool is used to examine the relationship between the two factors.
Control chart *A line graph that includes control limits. It is intended to facilitate judgments of whether or not an abnormality has occurred in the process based on changes in characteristic values, and to maintain stability in the process.	⊙Used to take the required action and constantly maintain stability (controlled status), when abnormality in a process occurred.	

2. Stratification

1. What is Stratification?

Stratification is used in cases where there are large volumes of data; it means focusing on common elements and characteristics that are easy to handle, and dividing data with similar common points and characteristics into groups. When stratification is used effectively, we can discover the causes of variance, find a starting point for improvements without using specialized methods, and take the appropriate measures.

“divide, compare, and find the differences” ⇒ “**Understanding by stratification**”

2. Procedures for Stratification

Step 1: Clarify the problem or the specific items that need to be resolved
number of defects, defect rate, yield rate, days of delivery-delay, etc.

Step 2: Decide on stratification items
by machine, by operator, by time, by type of defect, etc.

Step 3: Obtain data
Prepare a checksheet that indicates the stratification items

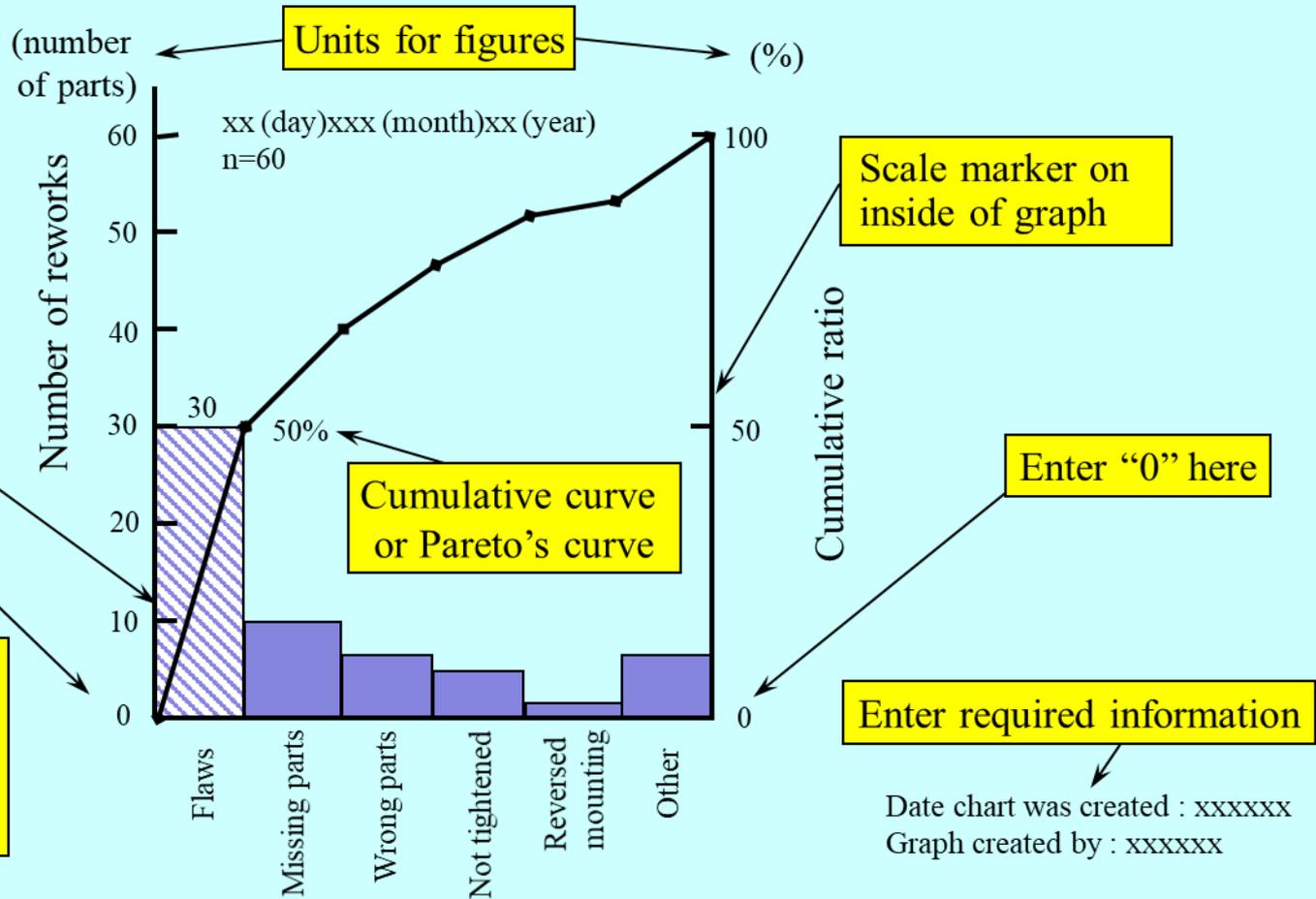
Step 4: Analyze data
The use of methods such as graphs, Pareto's charts, or histograms will make it easier to find the differences.

3. Pareto's Chart (1)

The differences can be made even clearer by putting hatching on the main items.

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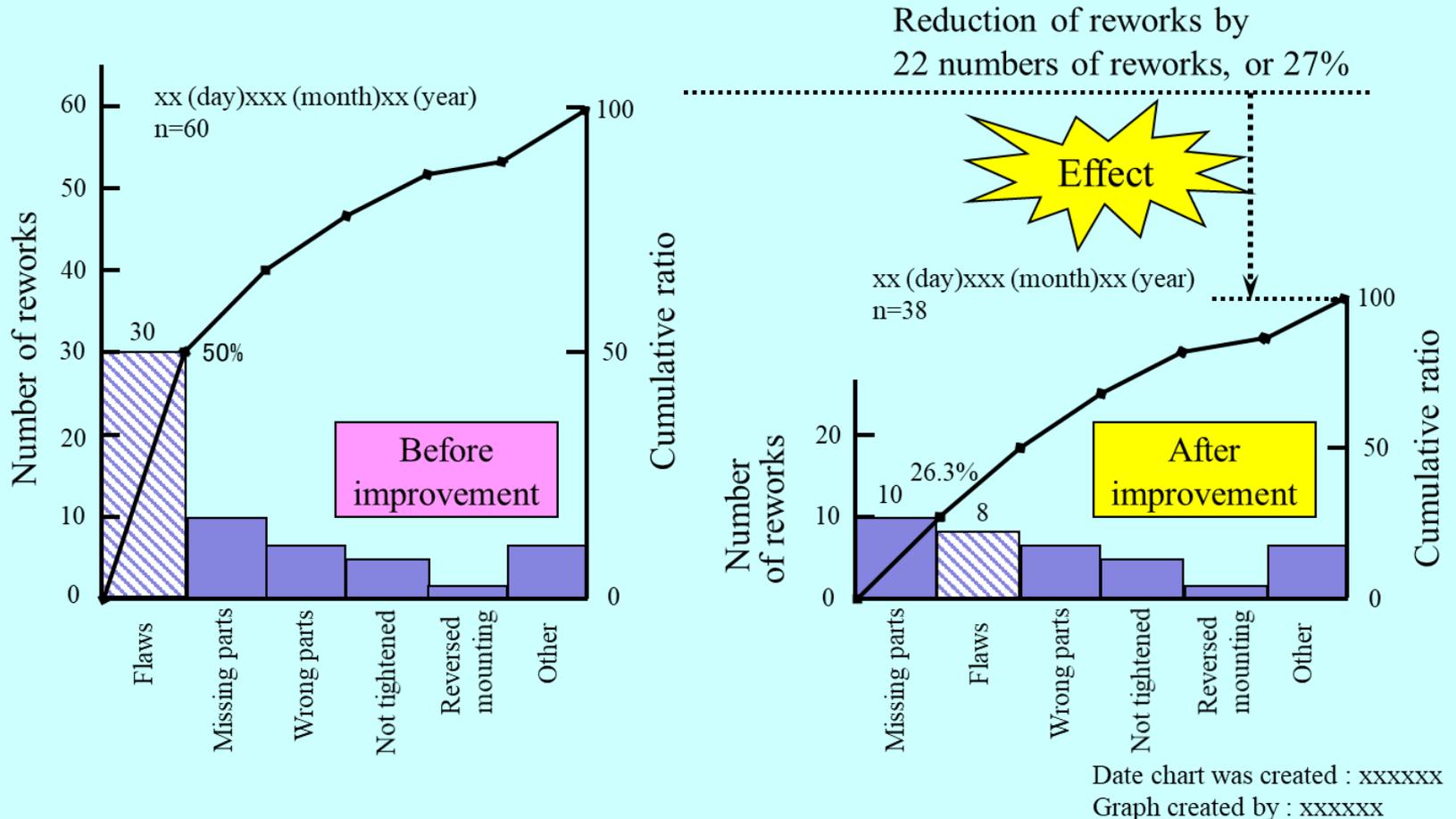
In the case of a diagram or graph, it is common for the title to be on the bottom.



Pareto's chart for reworks in assembly process

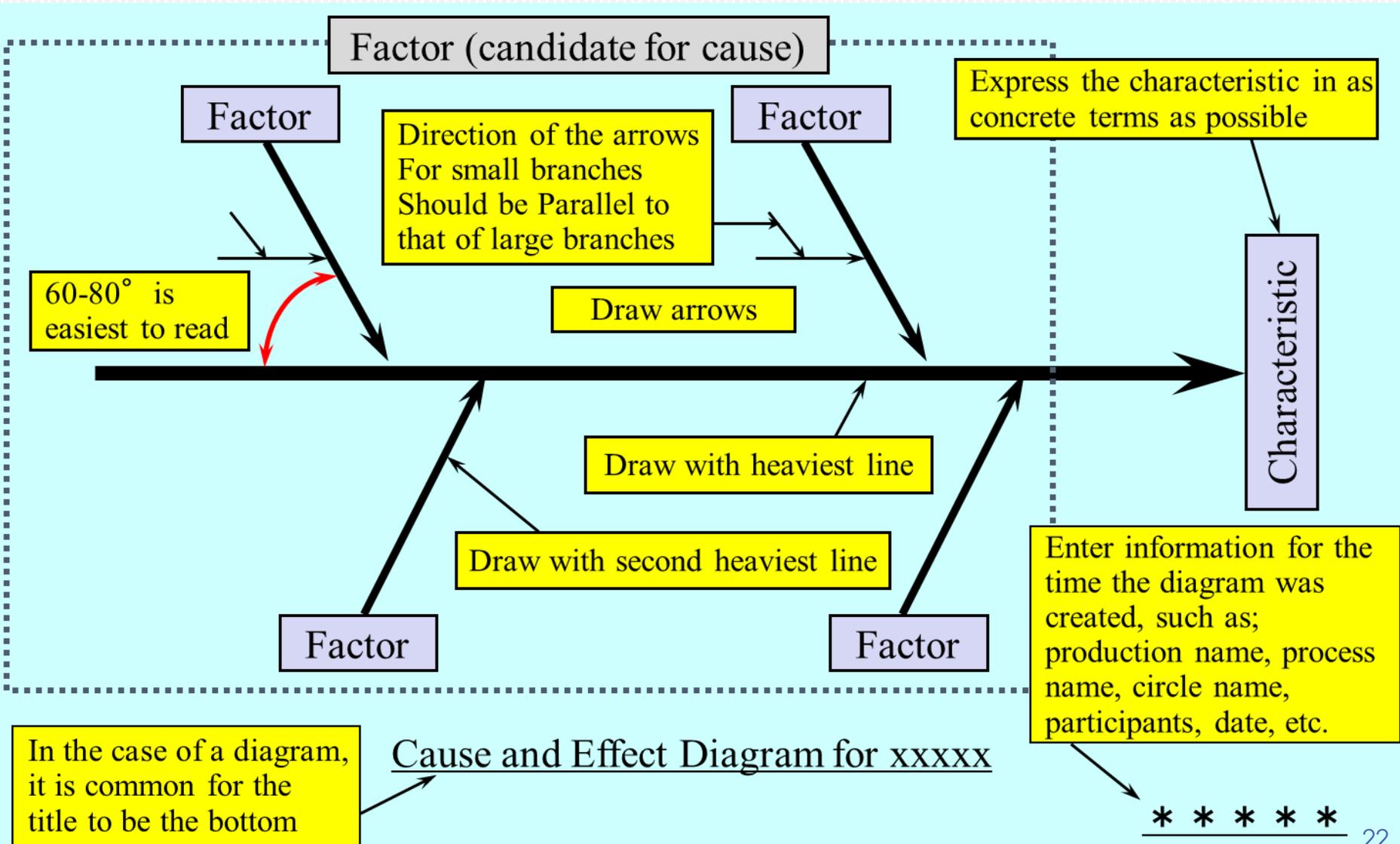
3. Pareto's Chart (2)

Confirm effect after measures implemented

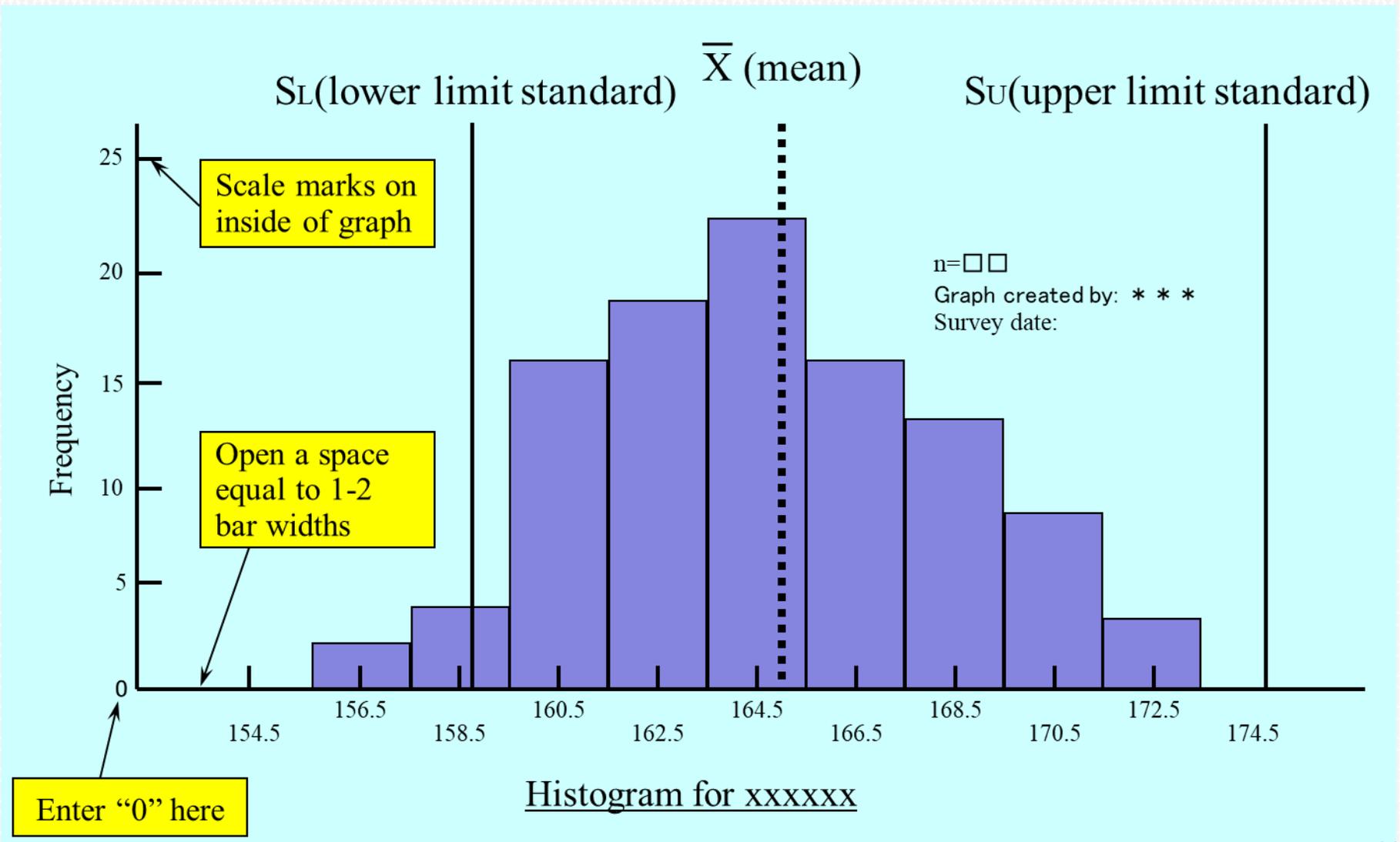


Pareto's chart for reworks in assembly process before and after improvements

4. Cause and Effect Diagram



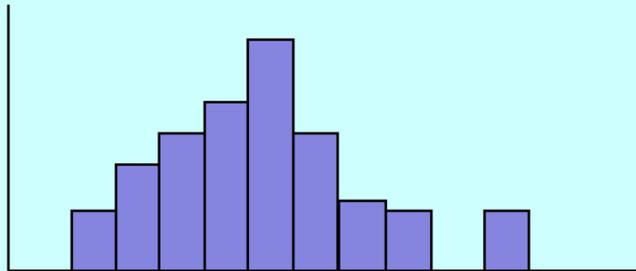
5. Histogram (1)



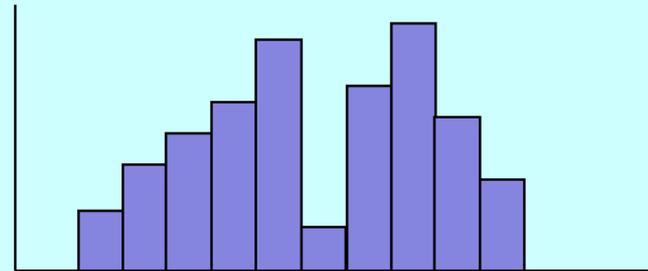
5. Histogram (2)

Grasp the distribution form from the shape of the histogram

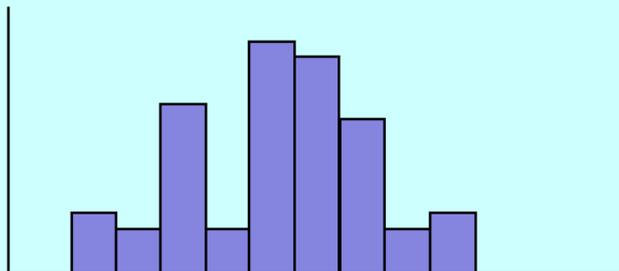
①“Remote Island”



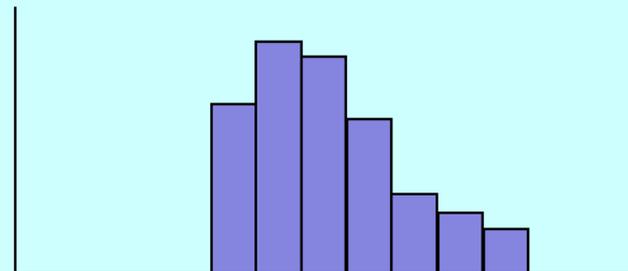
②“Double Mountain”



③“Missing Tooth”



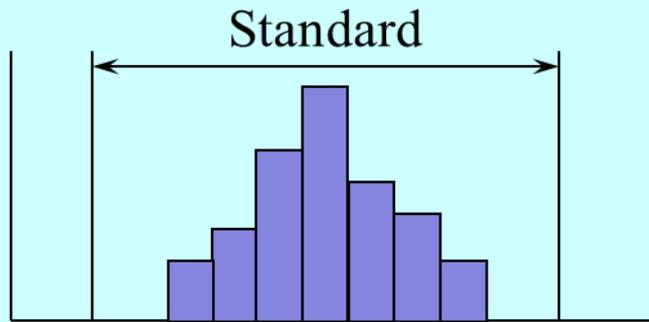
④“Precipice”



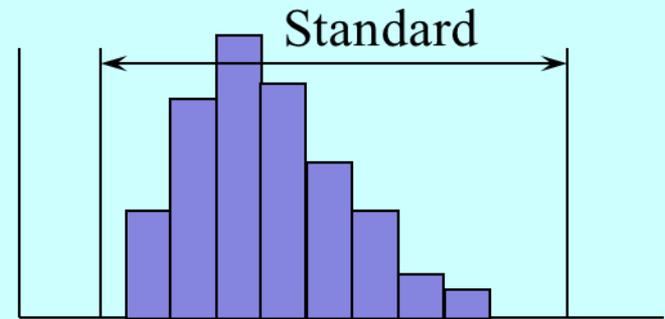
5. Histogram (3)

Look at the relationship with standards

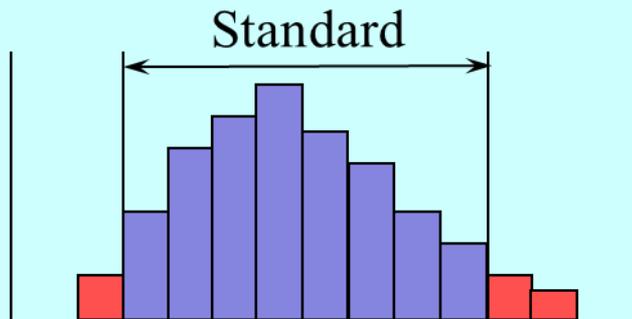
① “Ideal”



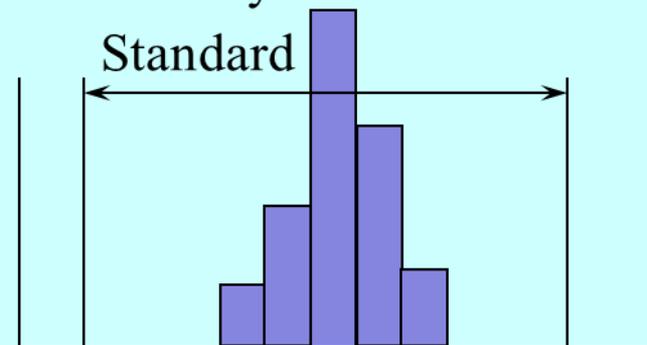
② “Center shifted to the left”



③ “Large variance, with defective parts appearing on both sides”

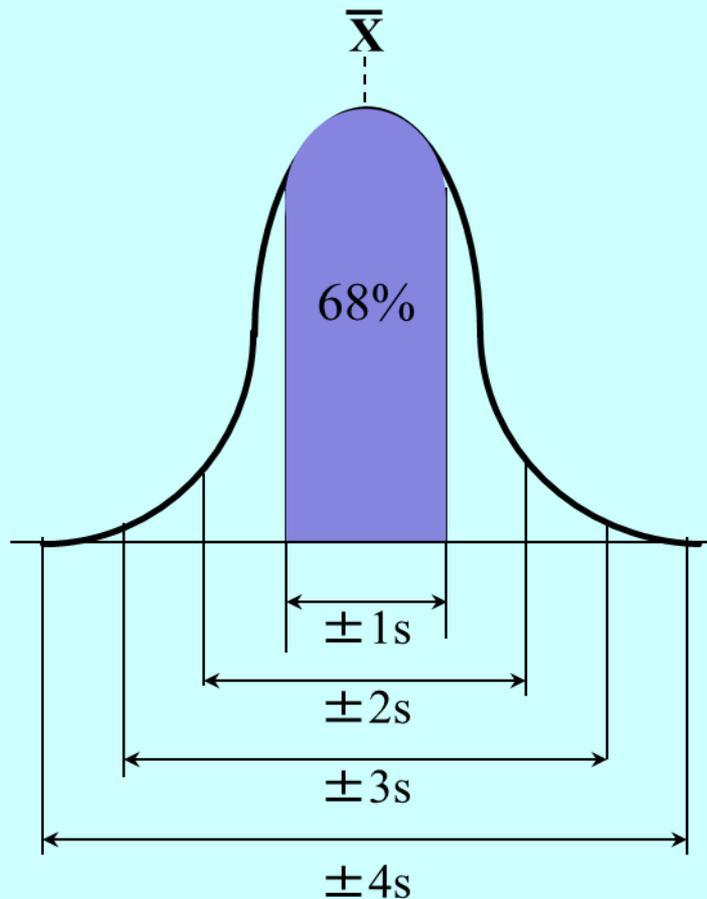


④ “Little variance, and leeway available”



5. Histogram (4)

Normal distribution and standard deviation



Range	Inside standard tolerance	Outside standard tolerance
$\pm 1s$	68%	32%
$\pm 2s$	95%	5%
$\pm 3s$	99.7%	0.3%
$\pm 4s$	99.994%	0.006%
$\pm 5s$	99.99994%	0.00006%

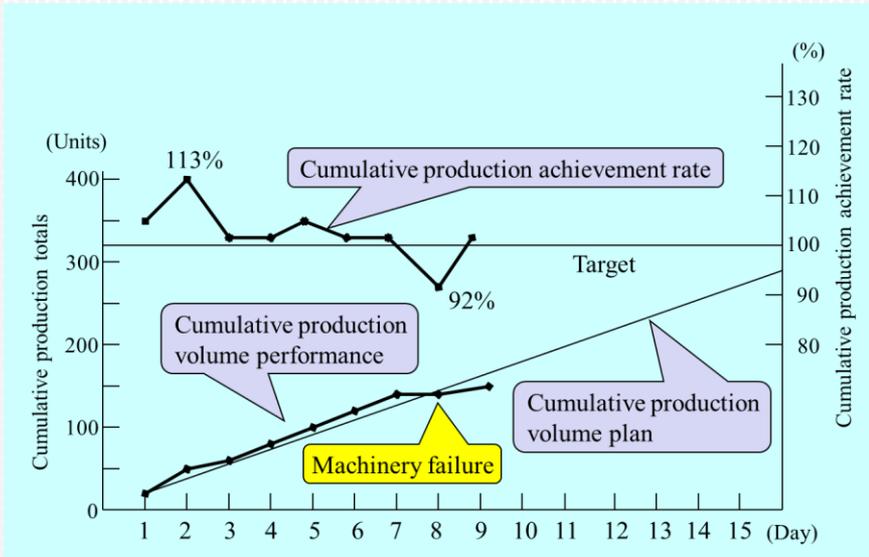
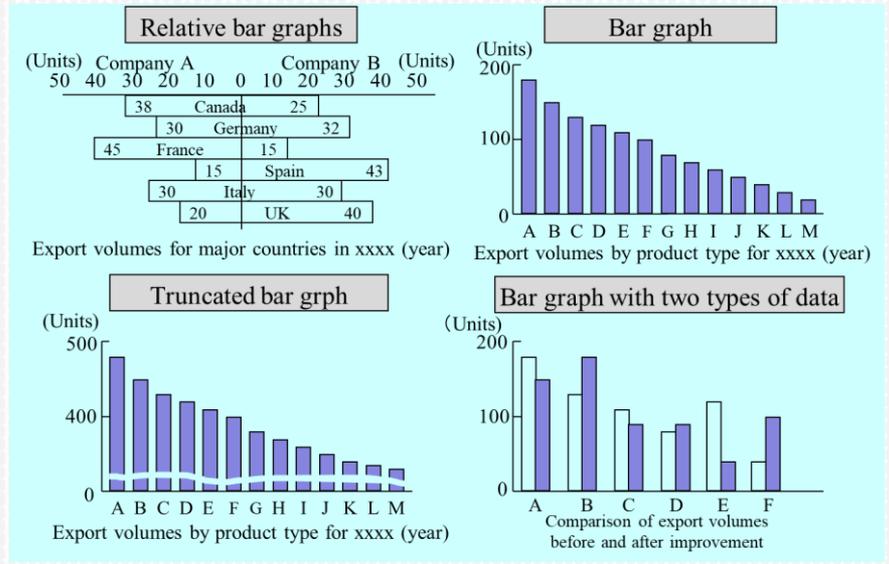
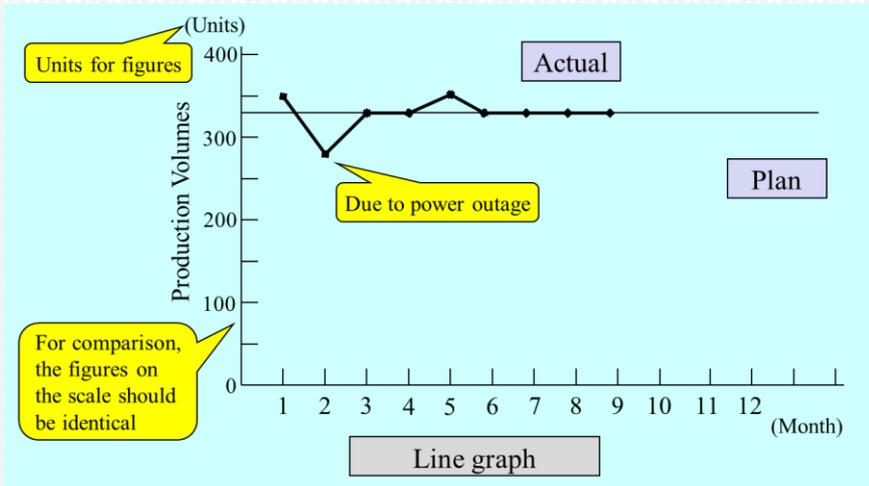
5. Histogram (5)

✓ Process Capacity Index

Process Capacity Index (Cp)	Measures	Illustration
$Cp \geq 1.67$ Process capacity is exceptionally high	Even if variance in products increases to some extent, no defects will occur. If it appears that maintenance costs are high, it is necessary to review streamlining of Management, etc.	
$1.67 > Cp \geq 1.33$ Process capacity is sufficient	This is the proper situation with relation to the standards, and so should be maintained.	
$1.33 > Cp \geq 1.00$ Process capacity could not be called sufficient, but is at least tolerable	Requires attention. Because there is a possibility of defects occurring, take measures to increase process capacity by conducting 100% inspections or improvements.	
$1.00 > Cp$ Process capacity is insufficient	Under these conditions, defects will occur. It is necessary to increase process capacity, through such means as improvements in Work methods or a review of standards, with improvements and maintenance of machinery and equipment.	

Characteristic	Data condition and result	Outside standard tolerance
When the mean is in the center of the standard	$S_L = 49$ $S_U = 51$ the mean = 50 the center of the standard = 50 $C_p = 1.33$ $C_{pk} = 1.33$	
When the mean is shifted 0.50 from the center of the standard	$S_L = 49$ $S_U = 51$ the mean = 49.50 the center of the standard = 50 $C_p = 1.33$ $C_{pk} = 0.67$	
When the mean is shifted 0.75 from the center of the standard	$S_L = 49$ $S_U = 51$ the mean = 49.25 the center of the standard = 50 $C_p = 1.33$ $C_{pk} = 0.33$	

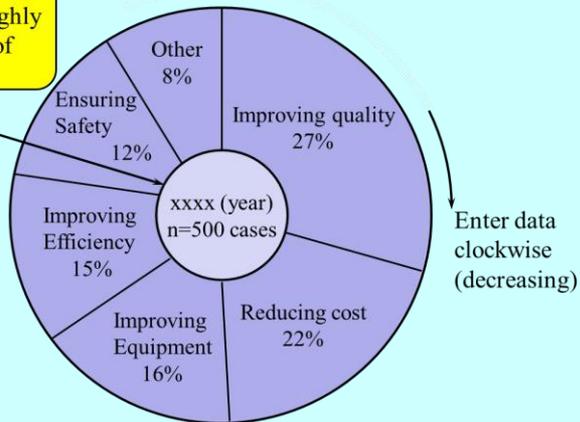
6. Graphs (1)



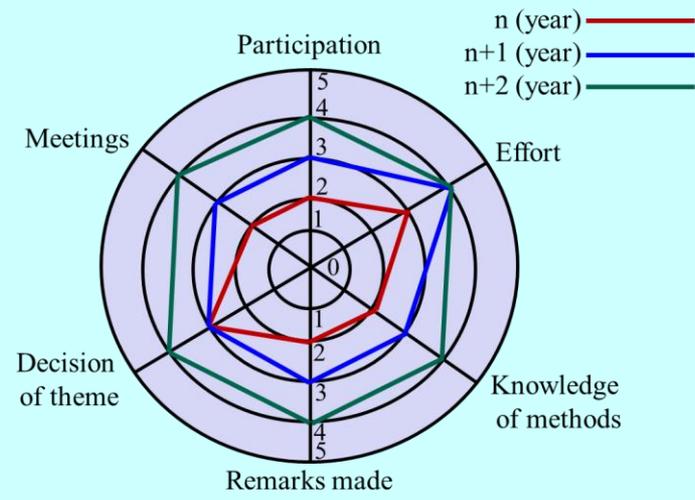
Z graph for cumulative production totals and cumulative achievement rates

6. Graphs (2)

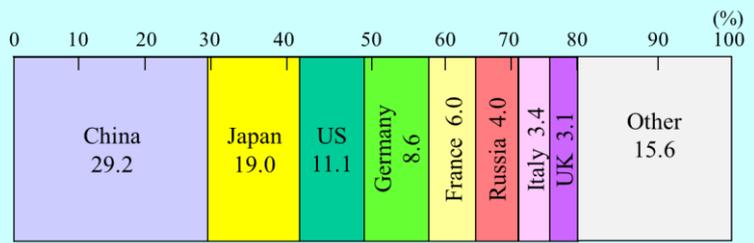
Inner circle is easiest to read if it is roughly 1/3 the diameter of whole



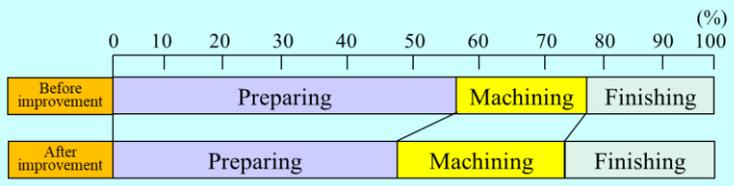
Fundamentals of creating a pie graph



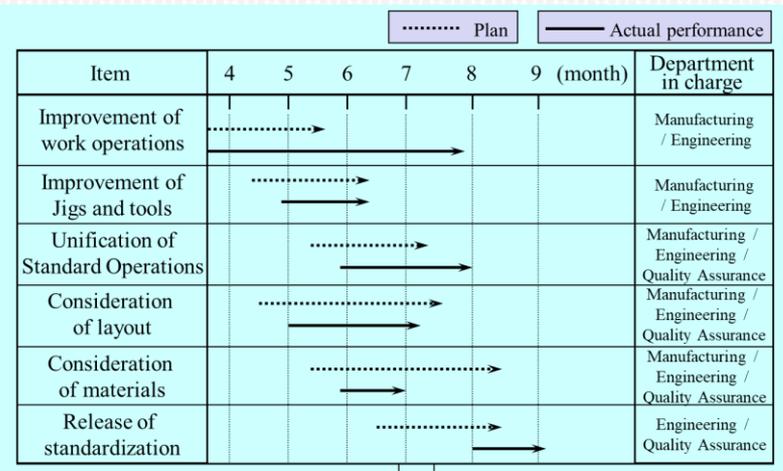
Radar Chart for self-diagnosis of QC Circle Activities



Band Graph for Worldwide Automobile Production Volumes

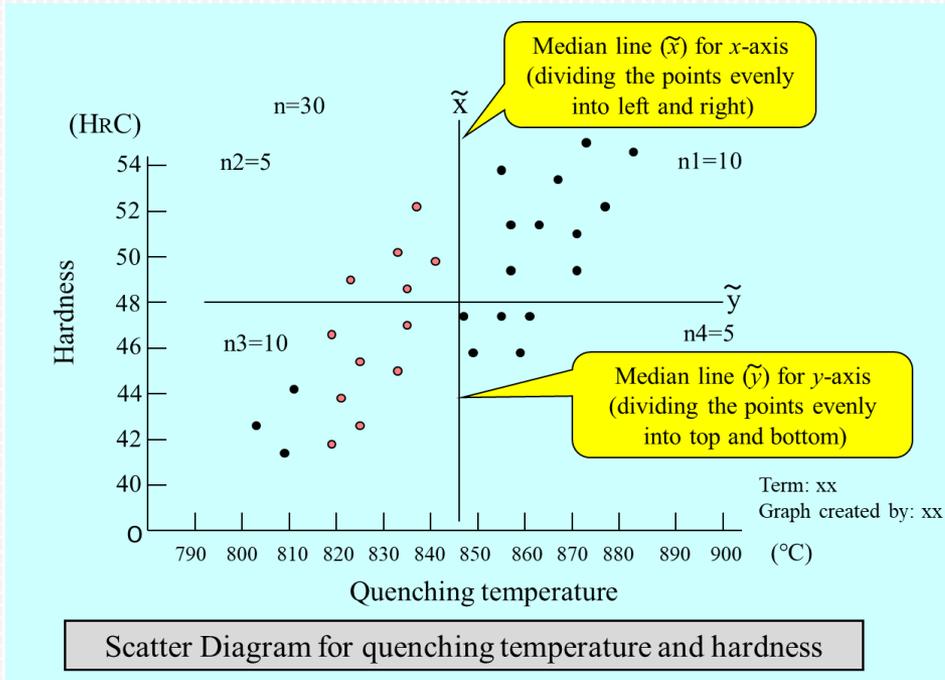


Belt graph of comparison ration for machining time



Gantt Chart for improvement plans

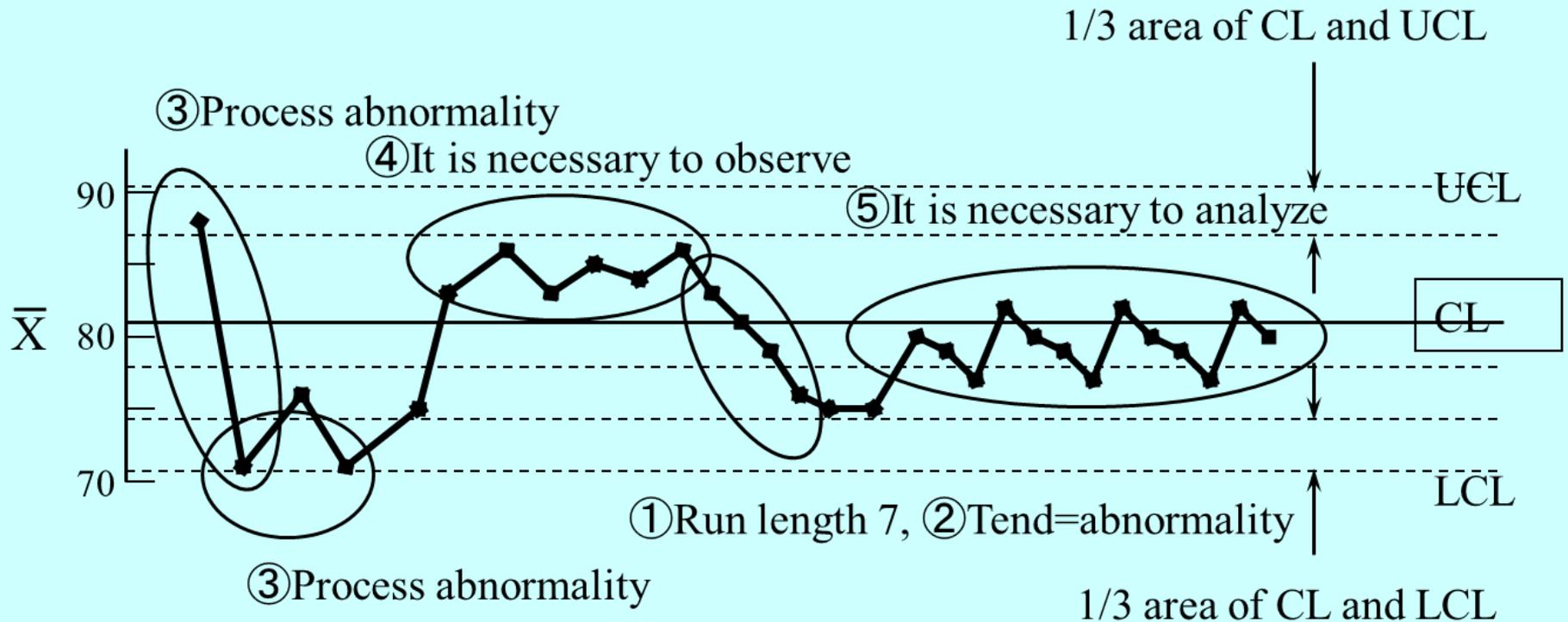
7. Scatter Diagram



Characteristic	Forms of scatter diagrams
Positive correlation	
No correlation	
Negative correlation	

8. Control Chart

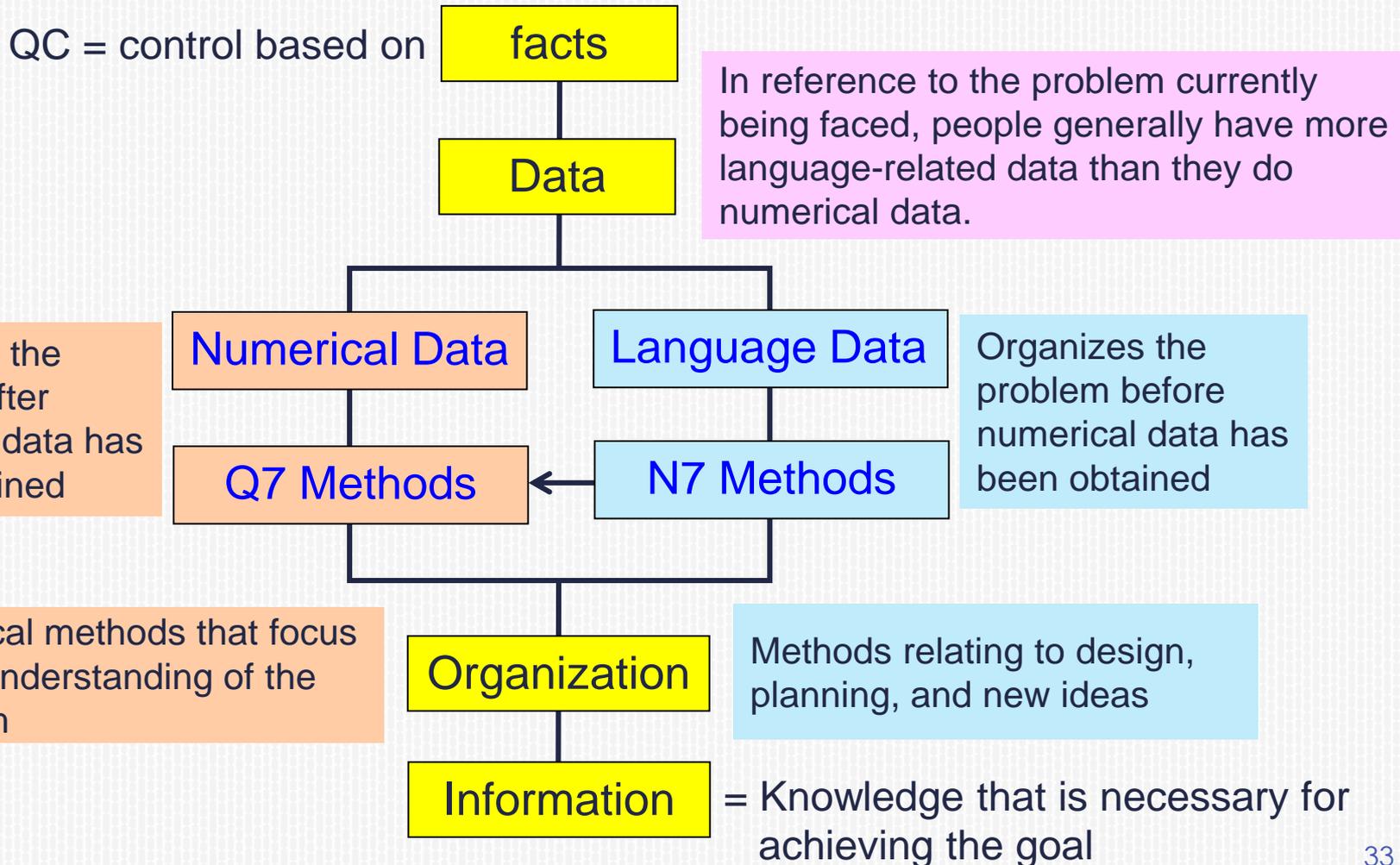
- ① Run ② Trends ③ Points plotted near the control limits
 ④ Points close to the center line ⑤ Periodicity



III 7 New QC Tools

1. 7 New QC Tools (1)

1. Relationship between 7 QC Tools and 7 New QC Tools



1. 7 New QC Tools (2)

2. Positioning of the 7 New QC Tools in the PDCA Cycle

Methods of making the planning stage more effective

Organization of disorder and chaos and establishing the target problem

Affinity Diagram

Relation Diagram

Matrix Data Analysis



Development into practical measures

Matrix Diagram

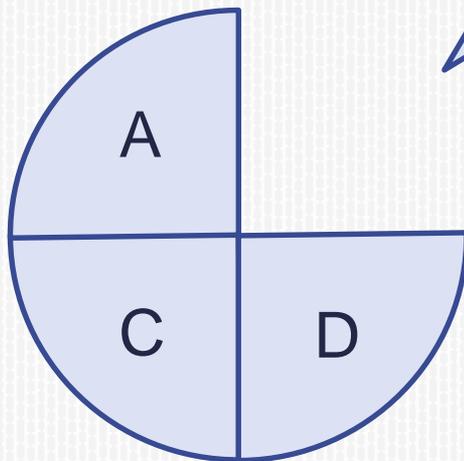
System Diagram



Arrange the measures chronologically and create an action plan

Arrow Diagram

PDPC Method



1.7 New QC Tools (3)

3. Outline of 7 New QC Tools

◎ mark indicates the situations in which the tools are commonly used.

Method Name	Outline	Situations in which the tools are applied
7 New QC Tools (N7)	Relation diagram	*Using arrows, the diagram presents theoretically the relationship between problems and the factors that affect them. ◎Used when the aim is to clarify large, vague problems or problems in which many elements are intricately mixed together.
	System diagram	*A "tree diagram" that gives more detailed breakdown of methods intended to achieve a certain goal. ◎Used when the aim is to draw out specific policies in relation to a certain problem. ○Used to illustrate the relationship when the cause of a problem (negative element) can be explained using a physical mechanism.
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	PDPC method	*This flow chart illustrates, using a series of arrows, the measures that should be taken against changes in the work situation, and each stage of those changes. ○Used when the aim is to establish a plan to try a series of methods one after another with the intent to resolve a problem. In particular, used when information is insufficient, and when the situation is unstable and the information unreliable and difficult to predict.
	Affinity diagram	*This diagram summarizes verbal data such as facts, opinions, and ideas based on the affinity (similar in meaning to interconnectiveness) among the various types of data. ◎Used when the aim is to summarize vague problems--such as those expected to arise in the future or those which up to now have been difficult to investigate--and at the same time to discover the specific problems that should be solved.
	Matrix data analysis	*A method of organizing large volumes of data, and obtaining a conclusion with a positive outlook. ○Used when the aim is to illustrate the relationship among three types of data (3-D) in an ordinary scatter diagram (2-D).

1. 7 New QC Tools (4)

4. Function of 7 New QC Tools

- ① **It is possible to organize the language data** It is possible to grasp facts, opinions, ideas, etc. about chaotic problems and vague problems with language data (words), **summarize the language data into relevant and similar things, and organize language data.** And the problem is clarified, it is possible to lead to the ideas and creativity.
- ② **It is possible to get an idea** It is useful for **conversion and development of ideas** without being confined to the scope. It is also a feature **that several proposals come out** for one problem.
- ③ **It is possible to enrich the plan** It is possible to **formulate foresight plans** and to carry out **overlapping plans smoothly.**
- ④ **It is possible to eliminate the missing and loss** By classifying and stratifying language data or systematically pursuing it, **the missing and loss of analysis are reduced.**
- ⑤ **It is possible to convince related sections** The **development process of the activity becomes easy to understand.**
- ⑥ **It is possible to obtain the cooperation of related sections, and to promote** By proceeding with agreement, **the development of activities will be smooth.**
- ⑦ **It is possible to appeal in the real intention** Because the language data is **close to the live voice, the ability to appeal is strong.**

1.7 New QC Tools (5)

5. How to Write and Express Language Data

- ① Language data should not be merely written as a noun, but **expressed as simple sentences** and language data, and **as close as possible to live voices**.
- ② **Expressing the facts** that you saw, listened to and experienced **as it was**.
It is OK if you guess, but in that case you should **make clear whether it is fact or guess**.
- ③ Express words with nouns and verbs in free terms. And, everyone should read and **understand the meaning, to avoid misunderstanding**.
- ④ Exaggerated and modified expressions should be avoided as there is a risk of misjudgment. Therefore, it is better **not to use exclamations, adjectives, adverbs as much as possible**.
- ⑤ Language data written on one sheet should **not have more than two meanings**. Its classification and stratification becomes difficult.

1.7 New QC Tools (6)

6. Good Examples of Language Data and Bad Examples

[Bad examples]

Quick temper



[Good examples]

(I) have a passionate nature.

Not sure the only "quick temper" (noun)

(If I is the subject, the subject "I" may be omitted.)

At the QCC meeting,
they do not gather at all.



At the QCC meeting, there are **always two or three people of absentee.**

"At all" is abstract and difficult to understand.

Situation is easy to understand in more detail.

Follow QCC activities.



Regularly **have leader meetings, listen to the concerns** of leaders and circle.

It is vague and difficult to understand.

It is concrete, easy to understand.

The supervisor's interest
in QCC activities is low.



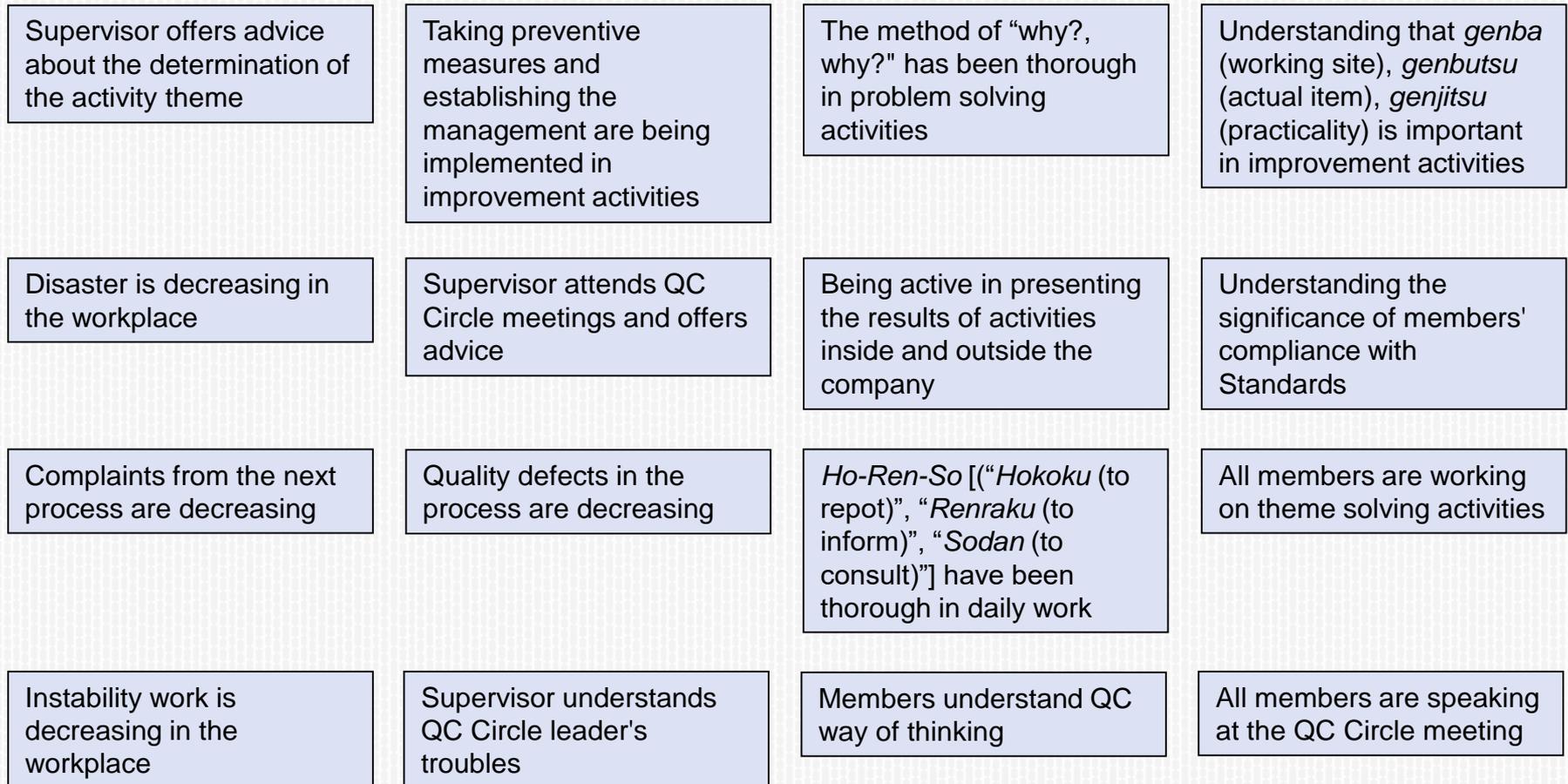
guess
The group leader is **probably busy,**
so he **never joins** the QCC meeting.
fact

Assertion of guess

Express guess and fact clearly.

2. Affinity Diagram (1)

✓ What is the Situation in which the Activation of QC Circle Activities is realized?



2. Affinity Diagram (2)

✓ Activation of QC Circle Activities

The level of Q / C / D / S is improving in the workplace

The results of securing the safety of the workplace are appearing

Instability work is decreasing in the workplace

Disaster is decreasing in the workplace

The quality level is improving in the workplace

Complaints from the next process are decreasing

Quality defects in the process are decreasing

Supervisor understands the QC circle activity

Supervisor offers advice about the determination of the activity theme

Supervisor attends QC Circle meetings and offers advice

Supervisor understands QC circle leader's troubles

Standardization has been promoted through improvement activities

Members are making efforts to standardize the results of improvement activities

Preventing recurrence and fixed management are being implemented in improvement activities

Being active in presenting the results of activities inside and outside the company

Improvement activities are implemented in QC way

Understanding that *genba* (working site), *genbutsu* (actual item), *genjitsu* (practicality) is important in improvement activities

The method of "why?, why?" has been thorough in problem solving activities

Members understand QC way of thinking

All members are actively working on maintaining / improving the workplace

Understanding the significance of members' compliance with Standards

Ho-Ren-So ["*Hokoku* (to report)", "*Renraku* (to inform)", "*Sodan* (to consult)"] have been thorough in daily work

All members are working on theme solving activities

All members are speaking at the QC Circle meeting

3. Relation Diagram (1)

✓ Why There are Individual Differences in Risk Sensitivity ?

Technical / skill level at the manufacturing site is declining

There is nothing that can guide risk assessment

There are few documents related to risk assessment

There is less opportunity to encounter dangerous situations

There are individual differences in risk sensitivity

There is a "individual difference" to the level of understanding of risk assessment rules

Construction volume is decreasing

OJT opportunities in the workplace are few

There is no unified risk standard

Risk assessment has just been introduced

Members are not able to image the hazards

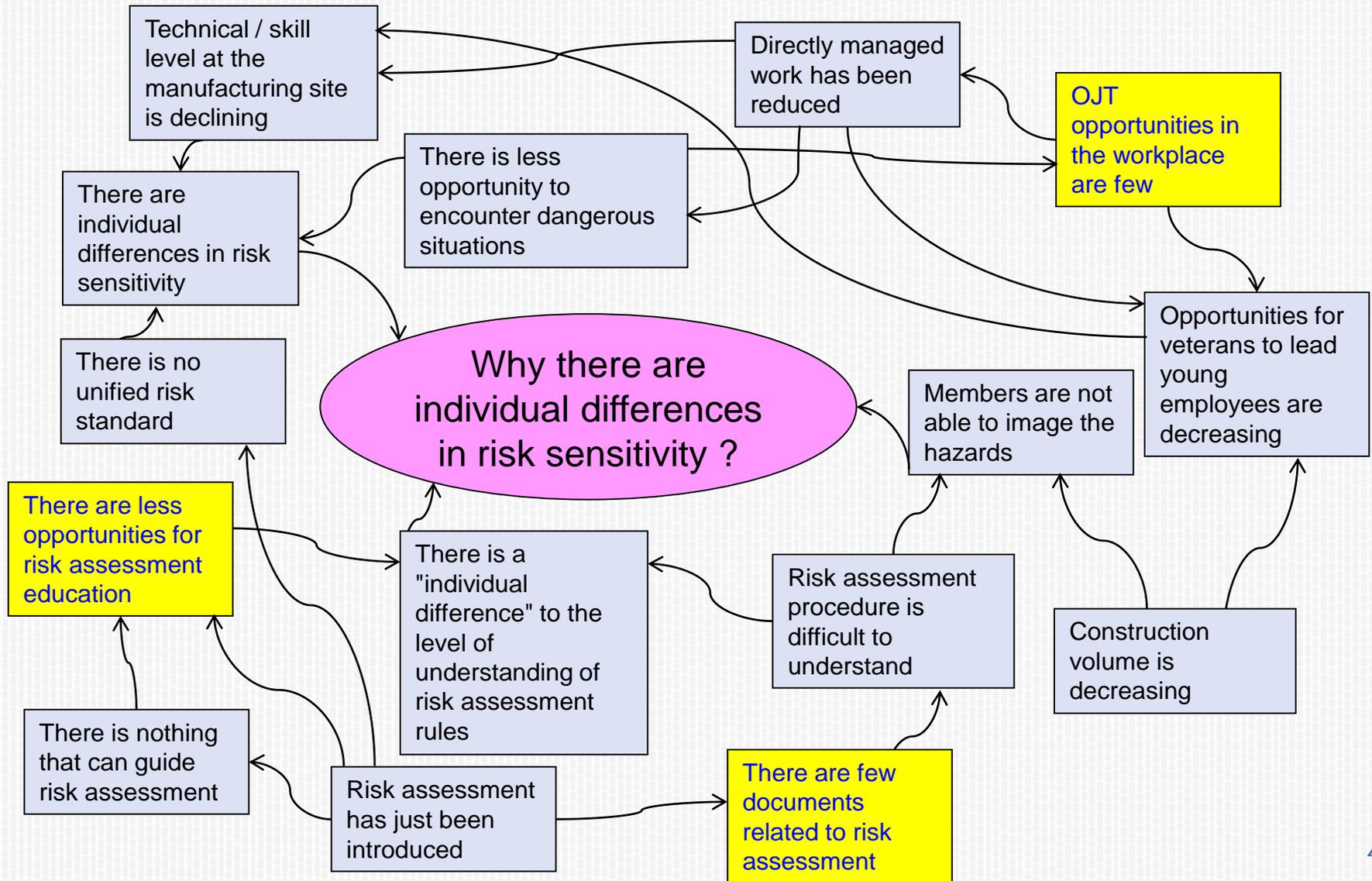
Directly managed work has been reduced

There are less opportunities for risk assessment education

Risk assessment procedure is difficult to understand

Opportunities for veterans to lead young employees are decreasing

3. Relation Diagram (2)



4. System Diagram and Matrix Diagram

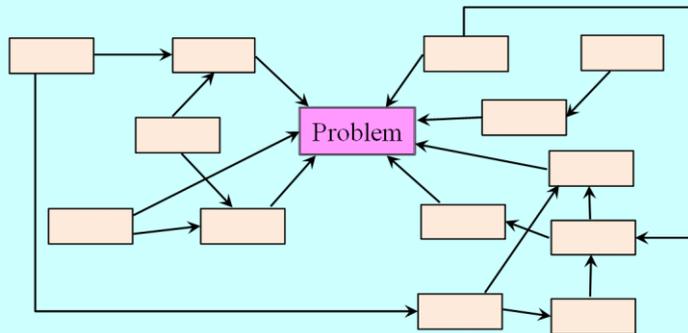
✓ Selection of the Most Appropriate Measure

				Effect	Fessibility	Economy	Overall evaluation
To reduce individual differences in risk perception	To implement the education of the risk assessment	To implement the training of risk assessment in the workplace	5	5	5	125	
		To participate in the risk assessment training outside the company	5	1	1	5	
	To learn through past accident cases	To implement the training of risk assessment based on similar cases	3	5	5	75	
		All construction workers implement risk assessment before work	5	3	5	75	
	To utilize risk assessment in actual work	To implement risk assessment in a real work	5	5	5	125	
		To evaluate each other the results of the risk assessment	5	3	5	75	
	To implement educational programs on risk	To make dangerous work actually experience	5	3	3	45	
		To make a simulated experience using the example video of human error	3	3	5	45	

5. Exercise

① Relation Diagram

Basic Rules of Relation Diagram



Causal-effect relationship between factors expressed by arrows

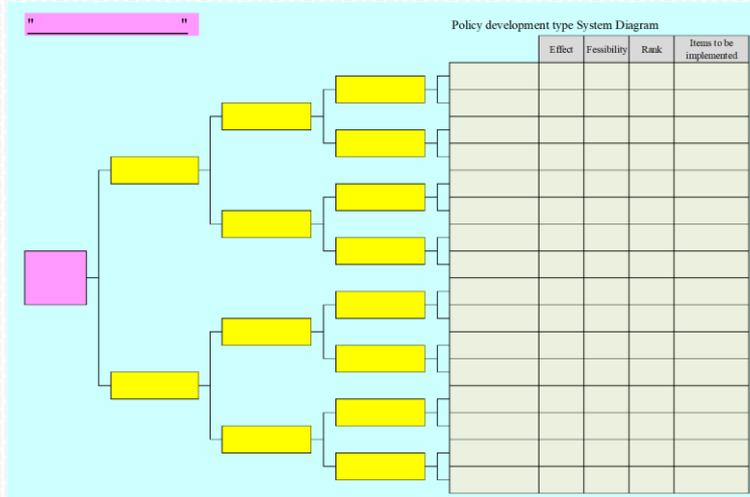
"Why do traffic accidents during commuting don't decrease"

Conclusion:

Why do traffic accidents during commuting don't decrease

Theme:
Member:
Created date:
Place:

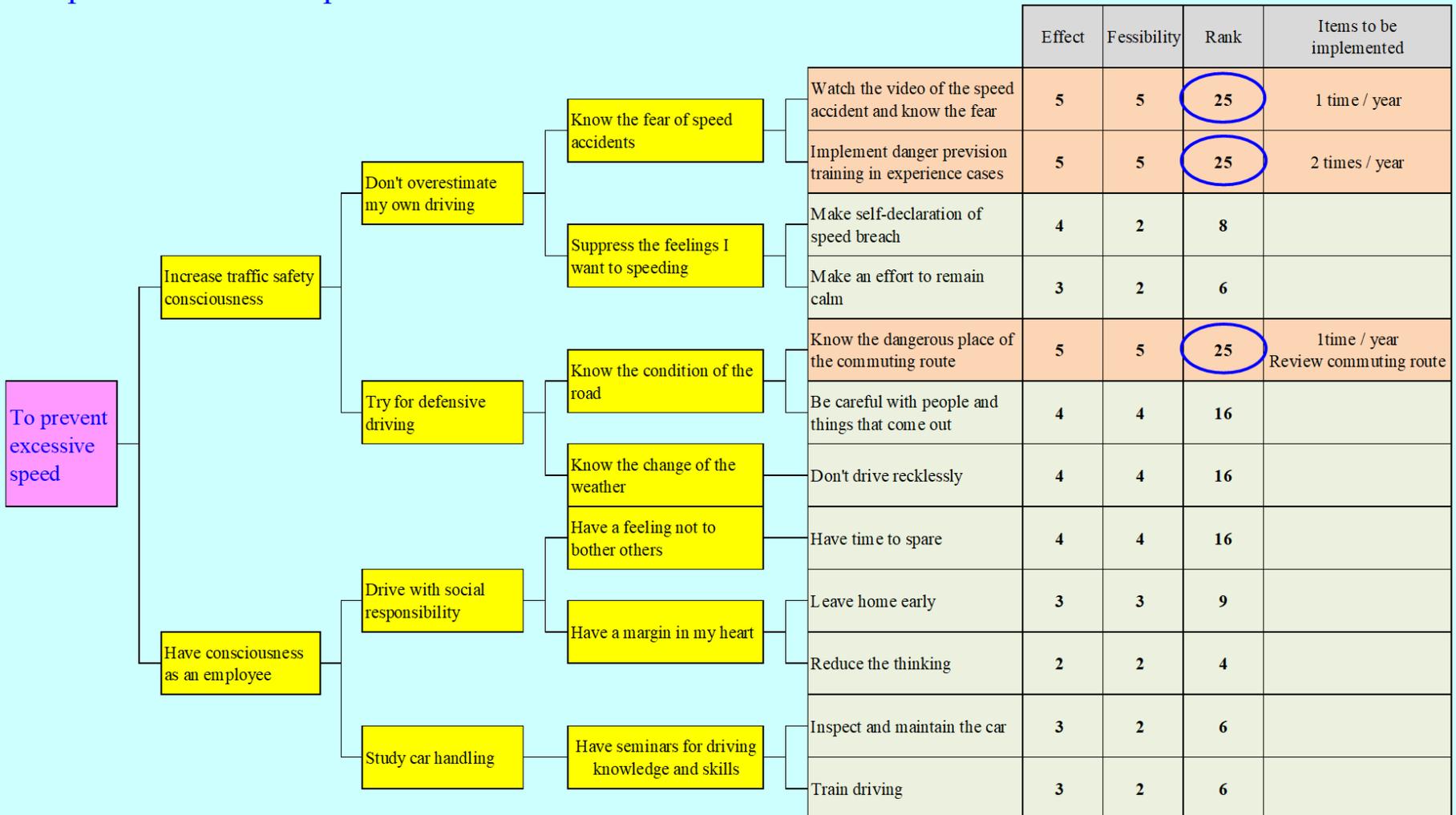
② System Diagram / Matrix Diagram



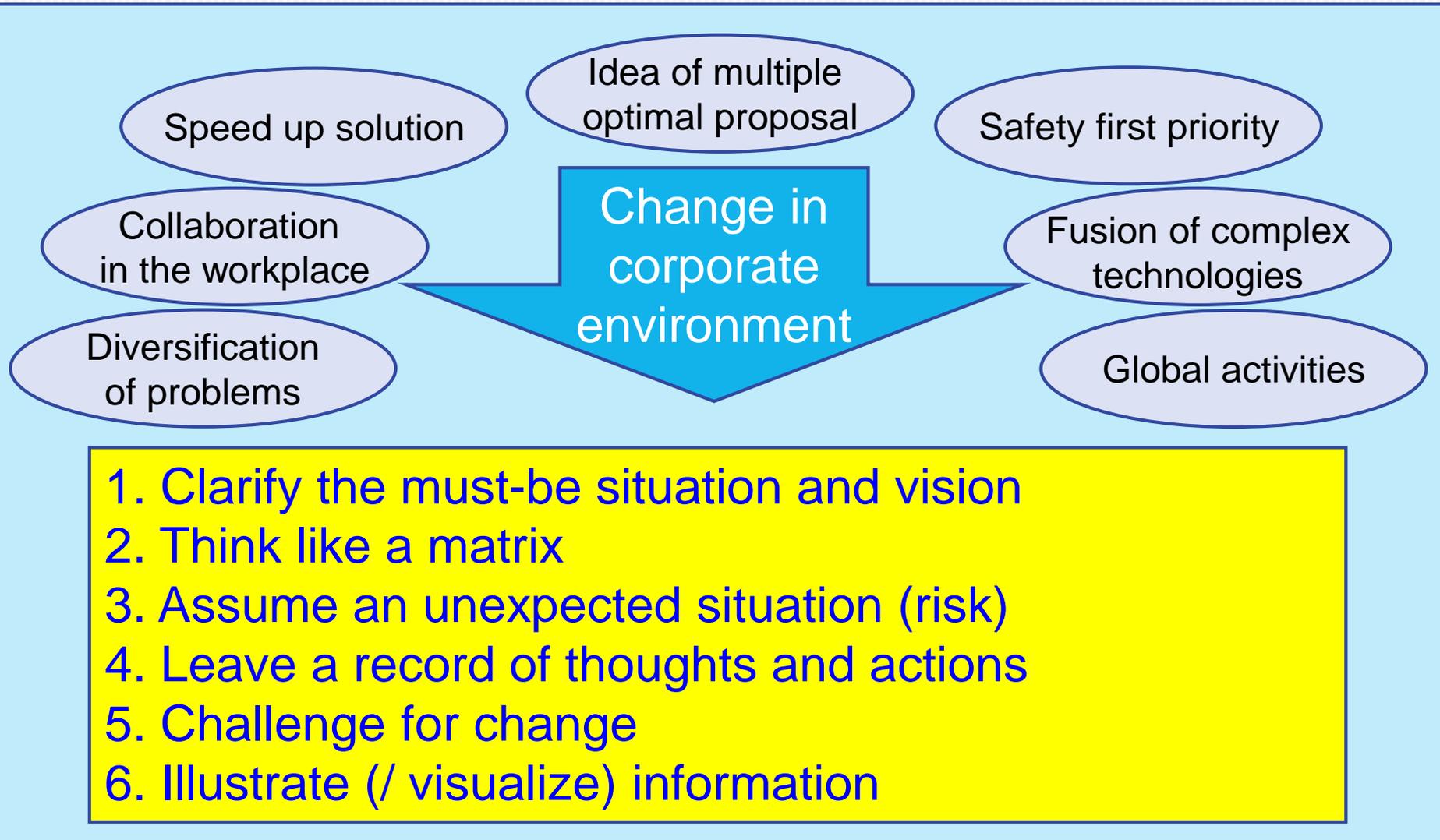
5. Exercise (System Diagram and Matrix Diagram)

"To prevent excessive speed"

Policy development type System Diagram



6. Role and Effect of “7 New QC Tools ” in Problem Solving



IV QC Circle and Supervisors

1. What is the Circle ? (1)

✓ What is the QC Circle ?

- ① The QC Circle is a small group of people, working at the front lines of the workshop, which conducts continuous control and improvement of quality with repeat to products, service, and work in general.
- ② In the course of its activities, this small group conducts operations independently, applies various approaches and methods related to Quality Control, displays creativity, and works to achieve personal development and mutual development.
- ③ The aim of these activities is to improve the abilities of the QC Circle members and to bring about self-realization; to create a bright, energetic workplace that offers a sense of accomplishment; and improve customer satisfaction and contribution to society.
- ④ In order that the activities of the QC Circle contribute to the improvement and development of the corporate structure, executive officers and managers shall consider these activities to be great importance in terms of both personnel education and improving activeness in the workplace, and carry out on their own initiative TQC and other similar company-wide activities, while at the same respecting the individuality of the staff and conducting instruction and support with the aim of encouraging the participation of the entire staff.

1. What is the Circle ? (2)

✓ Basic Philosophy of QC Circle Activities

- ① Demonstrate the abilities of individuals, and bring out their limitless possibilities.
- ② Respect humanity, and create a bright workplace that offers a sense of accomplishment.
- ③ Contribute to the improvement and development of the corporate structure.

2. Goals of QC Circle Activities (1)

1. Working toward Personal Development and the Creation of an Energetic Workplace

- ① To bring about mutual development while refining skills through friendly competition;
- ② Through the course of work, to create a place where each individual can apply his own knowledge and creativity;
- ③ To recommend staff to increase their own abilities;
- ④ To create a group with a strong bond and harmony among members, through activities with fellow staff; and
- ⑤ To assist in the growth of the individual, and create an energetic workplace.

2. Goals of QC Circle Activities (2)

2. Strengthening the Corporate Structure

At the workshop, we conduct work in small groups while deciding the share of labor for each individual, and it is these small groups that make up the company. In other word, we could say that **the strength of each individual workshop is in effect the strength of the company.**

In order to create a strong workshop, **managers and supervisors must exhibit both leadership and trust of their subordinates; each person working in the workshop must exhibit motivation and harmony; and there must be a high level of morale.** Furthermore, the key is to **promote control and improvement activities on a daily basis,** based on the elements noted above. **The actual work processes at the workshop are the target of QC Circle Activities.** These activities ensure that everyone contributes to making the workshop a better place, by combining each person's knowledge and abilities; as staff grow through their efforts to solve problems one after another, **QC Circle Activities tie this growth into the development of the workplace and the company as a whole.**

3. The Supervisor's Role in QC Circle Activities (1)

1. The Supervisor' Role is Backup

As the head of the workshop, **the supervisor's position is one of "backup"**; he must evaluate whether the subordinates under his charge are conducting activities in an organized way, whether these activities are bringing about satisfactory results, and whether each individual is working to the best of his abilities and growing.

It is therefore **necessary for the supervisor to watch over his subordinates, while offering advice** in areas such as whether the activities of the QC Circle at his workshop are in accordance with company policies, or whether activities have reached an impasse. In other words, the supervisor's position with respect to the QC Circle is one of an **"unsung hero"**.

3. The Supervisor's Role in QC Circle Activities (2)

2. Promoting the POCA Cycle as a Supervisor

【P】 Having targets and policies as a supervisor

Key to creating targets;

- Correctly grasp the actual circumstances surrounding the QC Circle

① As a supervisor, create goals with regard to promoting the QC Circle.

You must gain a clear understanding of the “Basic Philosophy of QC Circle Activities” described earlier, try to increase the energy of the QC Circle Activities, and establish targets that will tie into the creation of an energetic workplace that encourages the growth of the QC Circle members.

② The supervisor will not be able to move the QC Circle simply by creating targets; he must establish policies that are substantial enough to effect specific QC Circle Activities. It is also important to clearly identify the strengths and weaknesses of those activities.

3. The Supervisor's Role in QC Circle Activities (3)

2. Promoting the POCA Cycle as a Supervisor

【D】 Implementing policies

Key to implementation;

- Do not be excessively forceful, even if you think it is necessary to achieve the goals
 - Always be prepared to make changes in the policies as the situation demands
 - It is important to respond to the difficulties faced by the QC Circle, and offer stronger support whenever necessary.
- ① Implement policies that will change the weaknesses - - discovered through an understanding of the actual conditions - - into strengths.
 - ② Observe the changes in QC Circle Activities, both in terms of the group and of individuals, once the policies have been implemented.
If necessary, make amendments to the policies.

3. The Supervisor's Role in QC Circle Activities (4)

2. Promoting the POCA Cycle as a Supervisor

【C】 Evaluations with respect to targets

Keys to evaluations;

- Be hard on yourself
- Don't pass off responsibility onto others
- ① As a supervisor, you must make your own evaluations of whether or not you have achieved your targets in terms of promoting the QC Circle.
- ② Specifically, conduct a diagnosis and evaluation using “the QC Circle Activities checklist for supervisors”.

3. The Supervisor's Role in QC Circle Activities (5)

✓ The QC Circle Activities checklist for supervisors

QC Circle Activity Checklist for Supervisors

Date: (year) (month) (day)

Item	No.	Points of focus for diagnosis (diagnose each point of focus, and place a ○ mark in the appropriate to column)				
			Yes (sufficient)	Hard to say (insufficient)	No (unacceptable)	
Specialized knowledge / education	1	Do you have a clear understanding of the Circle's stage of growth, and do you have a policy for improvement?				
	2	Are you studying about QC of your own accord?				
	3	Do you understand the QC Story, and can you guide the QC Circle?				
	4	Can you guide the QC Circle in the use of the 7 QC Tools (Q7)?				
	5	Can you guide the QC Circle in the use of the 7 New QC Tools (N7; Relatin Diagram, System Diagram, and Matrix Diagram, three kinds)?				
	6	Do you use QC methods to solve problems in the course of daily activities?				
Ability to plan/ Ability to guide	7	Do you attend QC Circle meetings?				
	8	Do you offer advice at the meetings when the situatoin demands?				
	9	Do you meet with the leaders to discuss the content of meetions before and after they are held?				
	10	Do you offer advice about how to summarize the "yearly QC Circle Activity Plan / Performance Table"?				
	11	Do you observe and offer advice concerning how the Circle promotes its own PDCA cycle?				
	12	Do you offer advice to ensure that activities are conducted with all members' participation and with appropriate sharing of resposibility?				
	13	Do you offer advice about pursuing "Why? Why?" questions to go after the true causes of problems?				
	14	Do you offer advice about investigating and verifying the effects og factors using data?				
	15	When presentations are to be given, do you offer advice about the presentation or the preparation of a summary of main points?				
	16	Do you give directives to the Circle regarding themes that you would like to see taken up?				
Follow-up	17	Do you follow up on the "Yearly QC Circle Activities Plan / Performance Table"?				
	18	Do you follow up each month on the status of progress in resolving the issue that is the current theme?				
	19	Can the state of QC Circle Activities in the workshop be understood at a glance?				
	20	Do you follow up to ensure that the details of Taking preventive measures and Standardization are acceptable?				
	21	Do you follow up when the "QC Circle Activity Plan and Report" are presented?				
	22	Do you follow up to ensure that meetings proceed in accordance with the meeting plan?				
	23	Do you conduct follow-ups based on the "External QC Circle Conference Participation Report"?				
	24	Do you ensure uniform development with respect to the details of improvements?				
	25	Do you watch over the workshop to see that nothing is missed, in order to create a bright working environment?				
Evaluation	0-15 points: A dangerous situation. There is a need to immediately eliminate the obstructing element.		Distribution of points	2 points	1 points	0 points
	16-35 points: Room for improvement. Analysis for items of 0 point and 1 point is needed.		Diagnosis sub-total	points	points	points
	36-42 points: Good. Requires just a little more effect.					
	42-50 points: Very good. Continue efforts to achive even higher levels of satisfaction.		Diagnosis total			points 57

3. The Supervisor's Role in QC Circle Activities (6)

2. Promoting the POCA Cycle as a Supervisor

【A】 Summarize and review

Keys to review;

- Follow-up is essential

- Emphasize the process

- ① Have the QC Circle report on status and results of activities.

- ② If measures are behind schedule, have the QC Circle establish a recovery plan, and follow up.

- ③ Summarize the results of evaluation into “outcome” and “issues”, and reflect these in the targets for the following year.

- ④ Review also “whether or not you have also grown”.

4. How to add energy to QC Circle Activities (1)

1. The Supervisor Himself Must Put QC Activities in Practice

- ① With a focus on everyday data management, apply practices such as “management by visualization ” to respond to issues before they occur.
- ② Using statistical approaches and methods in problem-solving.
- ③ Bring out the knowledge of subordinates, and help them demonstrate their abilities.

2. The Supervisor Himself Must Clearly Understand the QC Circle Activities

- ① Understand the contents of the “What is the QC Circle ?” and “Basic Philosophy of QC Circle Activities”.
- ② Obtain information from materials related to the QC Circle.
- ③ Participate in QC Circle Conferences inside and outside the company.
- ④ Participate in exchange meeting inside and outside the company, exchange information, and absorb as much information as possible.

4. How to add energy to QC Circle Activities (2)

3. In Promoting QC Circle Activities, the Supervisor promotes his own PFDCA Cycle

- ① Having targets and policies as a supervisor
- ② Implementing policies
- ③ Evaluations with respect to targets
- ④ Summarize and review

4. Observe how the QC Circle promotes its own PQCA, and help to make this process easier

- ① Gain a clear understanding of the factors that prevent QC Circle Activities from processing smoothly.
- ② Bring these factors to the attention of the QC Circle members.
- ③ If the QC Circle is unable to eliminate these obstructing factors themselves, then the supervisor should do so.
- ④ Do not allow such factors to become an excuse for a stagnation of QC Activities.

V QC Circle and Managers

1. Instruction and Support Method of Managers (1)

1. Manager's Mind

① Passionate feeling:

Eagerness and belief (wish, mind) are important. Without these things subordinates will not grow.

② Achievement of business task:

The task is directly linked to the work, and the improvement activities are just management itself.

③ Human resource development:

When the manager wants to grow young employees, let him take charge of the QC leader.

④ Climate / Basic physical strength

There is a "climate" in which ourselves improve our own workplace.

1. Instruction and Support Method of Managers (2)

2. Success Experience

① Visible achievements:

Circle members can recognize that they contributed to the company through achieving the task.

② Award in the QC Circle Conference:

With the award at the presentation, the circle can be rewarded with labor and feel satisfaction.

③ Past success experience:

I grew up in the QC circle and worked hard for QC so I am now.

1. Instruction and Support Method of Managers (3)

3. High Evaluation

① Recognition of company / manager:

Manager praises in front of everyone (evaluation by result / process).

② Reflect assessment to individual:

The growing circle always appears in the manner of members' work. Manager does not miss this and reflects contributions to work in assessment.

1. Instruction and Support Method of Managers (4)

4. Motivation

① Setting opportunities of the regular conversation / contact:

Follow up on the progress of activities.

② Everyday voice call:

“Praise, involvement and interest” to the circle will be a pleasure for the circle members.

③ Setting opportunities to praise:

Set the special prize of the department and award it. Give the prize to the circle even a small presentation.

④ Guidance at the preparation stage of the presentation:

Implement the guidance meeting to be an easy-to-understand presentation.

1. Instruction and Support Method of Managers (5)

5. Communication

① Everyday:

Talk with a viewpoint that the circle is logically solving the problem using the QC method.

② Regular:

Introduce the achievements and awards of QC Circle activities at department meetings.

2. Manager Self-Diagnosis

✓ Manager Self-Diagnosis Table

Manager Self-Diagnosis Table

Date: (year) (month) (day)

No.	Diagnosis items (self diagnose each item, and place a O mark in the appropriate to column)	sufficient	insufficient
1	Do you utilize QC Circle activities as management of achievement of your department's task?		
2	Do you share workplace problems / tasks with the Circle (members)?		
3	Do you explain the task at your workplace and present it to the extent that the Circle can work on?		
4	Do you incorporate QC Circle activities into business plan of your department?		
5	Do you regularly follow up the progress of QC Circle activities and, if there is a delay, support the recovery strategy?		
6	Do you guide at the milestone on the theme of the important task?		
7	Do you support to make activities involving staff and related departments?		
8	Do you instruct benchmarking with other companies' models or other factories, and taking advantage of those excellent points?		
9	Do you properly read the "QC Circle Activity Report" and provide guidance leading to the next activity?		
10	Do you ensure horizontal deployment to your department or other factory regarding particularly excellent contents of Activity Report?		
11	Are you careful to plan education for Circle members?		
12	Do you support the presentation at the QC Circle Conference and prepare the environment for that?		
13	Do you promote improvement activities by the team and make efforts to create a rewarding workplace?		
14	Do you plan to devise measures to make QC Circle activities pleasant?		
15	Do you always talk to members when you see QC Circle activities at the workplace patrol?		

3. Manager's Role

The manager's own involvement (management) is important in order to develop and utilize the QC circle and achieve the business plan more effectively and efficiently.

Especially by assigning tasks and guidance by manager in the process of solution, the effect can be maximized.

And the accumulation of results will be the strength of the manufacturing site, large assets of the whole company, leading to sustained profitable growth.

VI QC Circle and QC Circle Secretariat

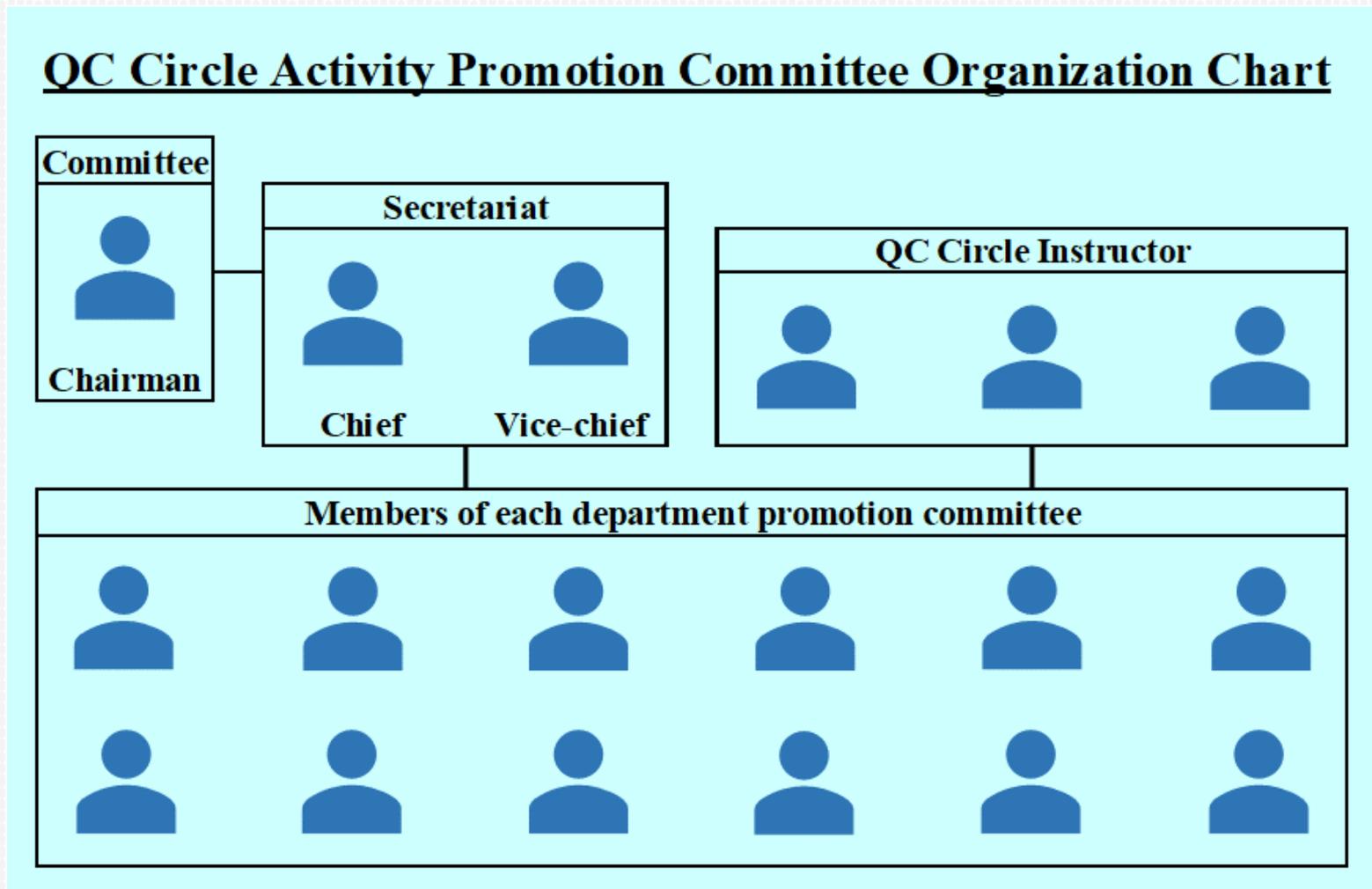
1. The Role of QC Circle Secretariat

✓ The Role of QC Circle Secretariat

- ① Creating and promoting a system for vitalizing the company's QC Circle activities as a whole.
- ② Planning and implementation of various education for QC Circle.
- ③ Creating an environment where QC Circle is easy to act.
- ④ Taking advantage of excellent points of other companies' QC Circle activities and ensuring those horizontal development.

2. QC Circle Activity Promotion Organization

✓ Promotion Organization



3. QC Circle Activity Annual Plan (whole)

✓ Activity Annual Plan

Confirm progress with **stage management table**

No.		Schedule	2020																																										
			Jan.2020			Feb.2020			Mar.2020			Apr.2020			May-20			Jun.2020			Jul.2020			Aug.2020			Sep.2020			Oct.2020			Nov.2020			Dec.2020									
Item		1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30	1	10	20	30
1	Regular meeting	■				□				□				□				□				□				□				□				□				□				□			
2	QC Small improvement month Summary	■				□				□				□				□				□				□				□				□				□				□			
3	Each QC Circle theme registration (2 cases/half a year)	□Each Circle theme registration			□Progress review			□Each Circle theme registration			□Progress review			□Each Circle theme registration			□Progress review			□Each Circle theme registration			□Progress review			□Each Circle theme registration			□Progress review			□Each Circle theme registration			□Progress review										
4	QC Circle Conference inside the company	□The 10th QC Circle Conference inside the company												□The 11st QC Circle Conference inside the company																															
5	Training outside the company	□Worksite management			□QC process table			□QC Circle instructor training			□Mid-level inspector training			□Employee psychological state management																															
6	Training and education inside the company	□Creating QC Circle theme list			□QC Circle theme list update			□QC Circle theme list update			□QC Circle theme list update			□QC Circle theme list update			□QC Circle theme list update			□QC Circle theme list update																									
		□QC Circle basic knowledge training 1			□QC Circle basic knowledge training 2			□QC Circle basic knowledge training 1			□QC Circle basic knowledge training 2			□QC Circle basic knowledge training 3			□QC Circle theme list update																												
	Planned STEP number	4	3	5	6	3	5	5	3	3	7	2	4																																
	Actual STEP number	2	0	0	0	0	0	0	0	0	0	0	0																																
	Planned total	4	7	12	18	21	26	31	34	37	44	46	50																																
	Actual total	2	2	2	2	2	2	2	2	2	2	2	2																																
	Progress rate (%)	50%	29%	17%	11%	10%	8%	6%	6%	5%	5%	4%	4%																																

Revision history			
Year / Month / Day	Details of revision	Preparation	Approval
	New provision		

Approval	Preparation

4. Education, Meeting and Presentation Conference

✓ Education

- Quality Control education
- QC Method education
- QC Instruction education
- Education by level (New employee, QC Circle member, QC Circle leader, QC promotion committee, Manager / Supervisor)
- Education outside the company

✓ Meeting

- QC Circle promotion committee meeting (1 times / month)

✓ Presentation Conference

- Factory Conference (1 ~ 2 times/year)
- Company-wide Conference (1 times/year)
- Participation in Presentation Conference outside the company

5. Activity Theme Registration of Each QC Circle

✓ Theme Registration and Progress Management

2020 QC Circle Theme Registration List

QC Circle Promotion Committee

April 1, 2020

No.	Section	Department	Circle Name	Leader	Theme	Circle Member	Circle number
1					① ②		
2					① ②		

QC Circle Activity Progress Table

QC Circle Promotion Committee

No.	Circle Name	Leader	Problem / Issue	Activirt Progress										
				Progress	Selecting a theme	Reason for selecting the theme	Understanding the current situation	Setting targets	Analysis	Measures	Confirming effectiveness	Taking preventive measures	Review and problems for the future	
1				Plan										
				Actual										
2				Plan										
				Actual										
3				Plan										
				Actual										
4				Plan										
				Actual										
5				Plan										
				Actual										
6				Plan										
				Actual										
7				Plan										
				Actual										
8				Plan										
				Actual										
9				Plan										
				Actual										
10				Plan										
				Actual										

6. QC Circle Activity Plan and Report

1. Regular Version

2. Simplified Version

QC Circle Activity Plan									
Circle Name									
Theme (Briefly explaining business)									
Plan	(year)	(month)	(day)	Manager	General foreman	QC promise number	Foreman	Preparation	
Theme history : This fiscal year : cases, total : cases									
Theme category * (place a O mark in the appropriate item)									
Q: Quality	C1: Direct material / Expense	C2: Labor cost	D: Delivery date / Stock	S / M: Safety / Morale / Others	Standard Operation Sheet: Yes None				
Section (code)	Circle name	Leader name	Circle number	Foreman's / General foreman's policy					
Stage									
Collaboration									
Reason for selecting the theme (Express business using schematic drawing of part and 7 QC Tools such as Pareto chart, Graphs, Checksheet)									
Target (target item: what)									
(target value: how much)									
Activity period (deadline: until when)									
(year) (month) (year) (month)									
Annual expected effect									
No.	Procedure of activity	Division of jobs: Chief / Vice-chief	Activity period (month) (month)	Planning Schedule	Actual schedule: →				
1	Understanding the current situation								
2	Analyzing the cause								
3	Measures								
4	Confirming effectiveness								
5	Taking preventive measures; establishing the standardization and the management								
6	Review and problems for the future								
7	Presentation schedule								
Advice	Manager								
	General foreman								
	QC promise committee								
	Foreman								
1. Understanding the current situation (Analyze the current situation using 7 QC / 7 New QC Tools etc. such as Pareto chart, Graphs, Checksheet, Histogram, Relation diagram, Control chart)									

Activity Result Report									
Report date (year) (month) (day)									
Manager General foreman QC promise number Foreman Preparation									
Meeting achievement from planning to resolution	Number of meetings times								
	Meeting time: hour								
	Meeting participation rate: %								
2. Analysis (Examining the cause and verifying using 7 QC / 7 New QC Tools etc. such as Cause and effect diagram, Histogram, Scatter diagram, System diagram, Relation diagram, Control chart, Matrix diagram)									
3. Measures (Developing measures using 7 New QC Tools etc. such as Arrow diagram, System diagram, Matrix diagram)									
4. Confirming effectiveness (Comparing before and after measures using 7 QC Tools etc. such as Pareto chart, Histogram, Graphs, Control chart)									
Effect amount:									
5. Taking preventive measures; establishing the standardization and the management (establishing the management to prevent recurrence using Graphs, Checksheet, Control chart etc. It is good to see continuation of the effect)									
Standardized document name: Creation / Revision (year) (month) (day)									
6. Review and problems for the future									
Advice	Manager								
	General foreman								
	QC promise committee								
	Foreman								

<Simplified version> QC Circle Activity Plan									
Theme (Briefly explaining business)									
Plan (year) (month) (day)									
Manager General foreman QC promise number Foreman Preparation									
(Theme history: This fiscal year: cases, total: cases)									
Theme category (place a O mark in the appropriate item)									
Q: Quality	C1: Direct material / Expense	C2: Labor cost	D: Delivery date / Stock	S/M: Safety / Morale / Others	Standard Operation Sheet: Yes None				
Section (code)	Circle name	Leader name	Circle number *2	Target (what)					
Single									
Others									
Selecting a theme (Understanding the current situation if necessary)									
Activity period (deadline: until when)									
(year) (month) (year) (month)									
Annual expected effect amount (S)									
QC Circle Activity Result Report *2 How to count circle people: Number of Circle members at the time of Circle Leader sign									
Result (Measures and Taking preventive measures)									
Number of meetings times Report date: (year) (month) (day)									
Manager General foreman QC promise number Foreman Preparation *1 Standardized document									
Document name: Creation / Revision (year) (month) (day)									
Advice	Manager								
	General foreman								
	QC promise committee								
	Foreman								
* Theme category: Q: Quality (Incident countermeasure, accuracy improvement, evaluation method, etc.); C: Cost (C1: Direct material / Expense; Parts and material cost, power cost, consumables cost; C2: Labor cost; Improve efficiency by reducing man hours); D: Delivery date (Reduction in lead time, inventory reduction, shortening delivery time, etc.); S / M: Improvement of safety and morale, others									
*1 Standard Operation Sheet, Process Operation Sheet, Control Process Standards, Inspection Standards, Drawings, Work Processing Standards, Other specific document name									

VII SUMMARY

1. Education for QC Circle

✓ Education Required for QC Circle Activities

- The essence of QC Circle activities are problem solving. It is necessary to learn the formula for problem solving and try using it.

- Three elements for problem solving

Motivation; Learn the “What is the QC Circle ?” and “Basic Philosophy of QC Circle Activities”.

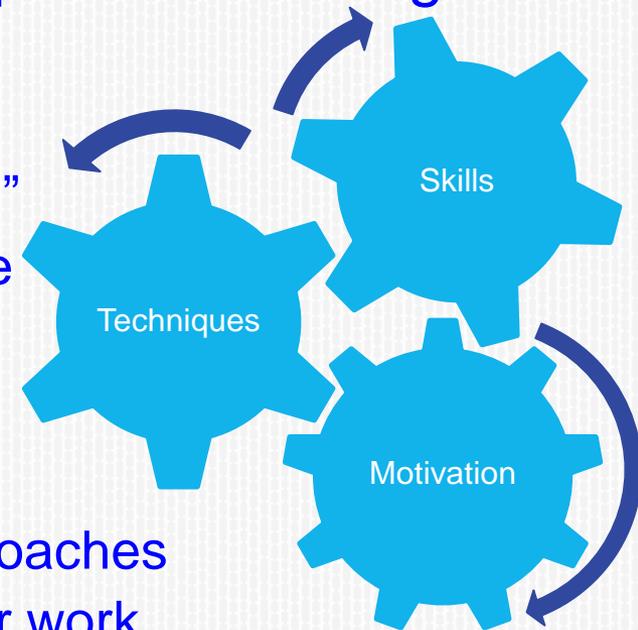
Techniques ; Problem solving well with QC approaches and QC methods

⇒ With QC problem solving approaches newcomers can quickly master work.

Veterans can also solve difficult problems that can not be solved by experience.

Skills ; Increase the specific techniques and skills necessary for work

⇒ The actual work processes



2. Everyone Takes Actions in their Places and Positions

✓ In Order to Activate the QC Circle Activity and to Produce Results

It is important that:

- ① QC circle members and leaders at the forefront of the workplace practice cheerfully activities.
- ② Managers and supervisors positively give guidance and support as promoters.
- ③ Executive officer positions QC Circle Activities as an important element of management and watches warmly.

✓ QC Circle Education is also Important

- ① QC circle members and leaders strive for self-development and mutual enlightenment.
- ② Promoters (managers / supervisors) plan useful QC Circle education.
- ③ Executive officer ensures and provides budget for QC Circle education.

3. Another

✓ “LEADER”.....“L·E·A·D·E·R”

- “L” is to **listen** to a talk of a subordinate, that is, “L” of **Listen**.
- “E” is to **explain** the work instruction until a subordinate is satisfied, that is, “E” of **Explain**.
- “A” is to **assist** the work of subordinates, that is, “A” of **Assist**.
- “D” is to **discuss** the contents and progress of work with subordinates, that is, “D” of **Discuss**.
- “E” is to **evaluate** subordinate work, that is, “E” of **Evaluate**.
- “R” is to take **responsibility** for subordinate work, that is, “R” of **Responsibility**.

THANK YOU
