Chapter 16

A Collection of Dr. Ishikawa's Quotes

16.1 Precepts from Dr. Ishikawa's Life

- Well, it all depends on how you look at it.

  Note: Dr. Ishikawa used this phrase often in his later years. When he had discussions with those who had different opinions from his during relaxing moments, such as in informal drinking parties, he used these words when the odds were against him, or when people were divided in their opinions and discussions got out of control. His true intent might have varied depending on situations, such as, for example, when there were enough discussions, or when there was some merit in what the other party said. The understanding of the editor is that he used these words in changing the topic. (Refer to Section 6.3 Mr. Tadashi Ishikawa)

- Listen to the others. (Refer to Section 6.3 Mr. Yasushi Kurokawa)
- What counts with golf is not QC, but your intuition (your sixth sense). (Refer to Section 5.1 Mr. Ryoichi Kawai)
- Golf is not QC. You have more fun to play golf if there is variation in your score. (Refer to Section 5.1 Mr. Tadakazu Okuno)
- You may feel you are embarrassing yourself by writing a book. (Refer to Section 4.3 Mr. Tadashi Asao)
- Read newspapers in every nook and cranny without fail. (Refer to Section 5.4 Mr. Yoji Akao)
- What's important is not whether you spoke or not, but whether you could put your thoughts across to the other side. (Refer to Section 6.3 Mr. Yasushi Kurokawa)
- You are still immature while you utilize your subordinates; you are mature if you can utilize your boss. (Refer to Section 3.2 Masumasa Imaizumi, Section 3.3 Mr. Yoji Akao, and Section 6.3 Mr. Yasushi Kurokawa)
- Become a person who can stay out of your company, but become one whom your company cannot do without. (Refer to Chapter 2 Mr. Tatsuo Sugimoto, Section 3.3 Mr. Koichi Ohba)
- Respect for humanity is one thing; respect for people is another. (Refer to Section 3.3 Mr. Koichi Ohba)

- Constant pitch (Refer to Section 6.3 Mr. Tadao Ishikawa)
- Don’t say you cannot do something without trying. Think how you can execute it.
- Don’t explain the reason why you can’t do something. Think how you can do it.
- Don’t make excuses. Think how you can make it. (Refer to Section 3.3 Ms. Haruko Mitsuaki)
- “*Kisama*,” what do you think of the future vision of about such and such company (organization)?

  Note: Dr. Ishikawa made it a habit of addressing the person he was talking to by using the word “*Kisama*” (a noun to refer to the second person) when he had some drinks. The part “such and such” varied depending on whom he was talking to, such as a company name, name of a university, or a research organization.

  While the word “*Kisama*,” which was used originally among navy officers, may sound derogative in modern days, he used it with a sense of closeness and affinity.

- The best timing for your marriage is when you are busy. (Refer to Section 3.3 Mr. Tatsuo Ikezawa)
- Have three children and send one abroad. (Refer to Section 6.3 Mr. Tadashi Ishikawa)
- Not pouring but let me just place whisky bottle!

  Note: This means that Dr. Ishikawa would not pour (serve) “*sake*” for his friend he was drinking with, as many Japanese would usually do, but would, instead, put a bottle in front of his friend so that the friend may enjoy the drink as much as he wanted. It was Dr. Ishikawa’s favorite style of drinking, and he encouraged his friends to do the same by using this phrase.

- Drink “*sake*” with self-control.
  (Talking about Dr. Ishikawa in his youth)
  “Didn’t you have hangover after drinking till so late at night?”
  “Oh, I had it every day!”
- Requirements for QC specialists: To have a common sense, to be able to utilize boss, and to be able to drink. (Refer to Section 5.4 Mr. Yoji Akao, Section 7.3 Mr. Nobuyoshi Takamatsu)
- How can you implement QC if you can’t drink “*sake*”? (Refer to Section 3.3 Mr. Tatsuo Ikezawa)
- Be greedy. It’s necessary to be greedy.

- Don't control. Inspire more. (Refer to Section 4.2 Mr. Tatsuo Ikezawa)
- Mental age of people decreases with advancement in the society.

16.2 Quality Control in General

(1) Necessity of Quality Control

- As long as your products or services are in the market, you should control their quality forever.
- Importance of quality control increases with advancement in society and modernization in manufacturing.

(2) Business Environment and Quality Control

- Cope with trade liberalization with quality control (mentioned in relation to liberalization of trade in 1960).

(3) In which industry or company should quality control be conducted?

- Quality control should be conducted by every industry.
- Quality control is applicable to any company. Rather, it must be implemented by every company.
- Unless you implement quality control, your company will disappear from the telephone directory.
- Move From Total Quality Control (TQC) or Company-wide Quality Control (CWQC) to Group-wide Quality Control (GWQC)

(4) Basic Principles of TQC

- Basic principles of quality control are the same for any industry.
- New quality control is an idea revolution for business management.
- TQC is to implement what you should implement. (Refer to Section 3.2 Mr. Masumasa Imaizumi)
- TQC is to implement what you should implement systematically throughout the organization.

- You must be greedy with QC.
- QC is a discipline of theory and practices.

(5) Effects of TQC

Overall Effects

- If QC propagates, international division of labor will progress, which intensifies mutual collaboration and dependence among countries, eventually restricting them to get into strife or wars leading to the world peace.
- Quality control involves doing what every industry should do without fail. The fact that it can bring great benefits has been proven in Japan and the rest of the world.
- If you implement QC, benefits will be brought to consumers, employees (including the management), shareholders, and furthermore, to the society at large.
- TQC is not a specific medicine. It's more like a Chinese herbal medicine.

  Note: TQC is not a quick remedy like penicillin, but is a medicine, like Chinese herbal medicine, that when taken for a long time, show effects gradually.

- QC which does not produce effects is not QC. Implement MMK QC ("*Mohkatte Mohkatte Komaru*" meaning being perplexed by making too much money).

  Note: MMK: Said to be originally a navy jargon, which stands for "Motete Motete Komaru" meaning "perplexed by being too popular among girls" Meanwhile, the basic word without conjugation of "mohkatte" is "mohkaru" meaning making money in Japanese. Because the capital letter of both words "motete" and "mohkatte" is the same, Dr. Ishikawa liked to use this phrase jokingly during lectures and talks.

- Market share should not be the first topic to be covered. More important are sales and profit ratio, to be followed by market share.
- If you dislike some food without even trying it, you will never know its taste, nor will it nourish you. TQC is one such food; if you chew it well, you will find it very delicious and nourishing.
- QC will bring the best out of gods. QC will bring "lies" out of your company.

Quality Aspect

- Improve quality (in the narrow sense) and defective products will reduce.

- Waste in operations will be minimal, rework will reduce, and efficiency will improve.
- Quality will be more uniform and consistent. Complaints will decline.
- You will be able to address complaints faster, and be able to prevent their recurrence thoroughly.
- You will be able to establish fine quality assurance system, enabling you to win confidence of consumers and customers.
- With Reliability being enhanced by QC, you will be more confident in your product which will be more reliable.
- You will be able to sell your products at higher prices.
- Your distribution channels will expand.
- You will be able to get market information more quickly and in more efficient ways.

Cost and Production Aspects

- Cost for inspection and test will reduce.
- Unit material requirements will improve. Productivity of added value will increase.
- Costs will diminish.
- If you implement quality control well, cost management will become real cost management.†
- When true cost management is performed, effects of quality control will rapidly increase.
- Production volume will increase. Efficient production planning will be possible.
- A company, where changes in production plan are not necessary, is a well-managed company.
- If quality control is carried out, quantity management will go smoothly, and vice versa. How can you implement QC when you don't know true numbers?
- You will be able to repair and install additional equipment or machinery more reasonably and selectively.

† It is common to carry out activities, under the name of cost management, for comparing historical cost and standard cost and for reducing the discrepancy between the two. Where QC is not in practice, such situations are observed as: that the standard cost may be calculated based on unclear operation standards; or that it is not clear whether or not SOPs or other standards of materials, equipment, etc., are well complied with in arriving at the historical cost, in which case, cost management in its true sense of the word is difficult to perform. In contrast, where QC is properly implemented, these points become clear, enabling to manage cost in its true sense.

- Exploit the full capability of the existing equipment or machinery before introducing new one.
- TQC is to get the best out of old equipment and machinery (in terms of both quality and quantity).
- Contracts with raw material suppliers, vendors and consumers will be streamlined.†
- It's technology that turns low-grade quality input materials into good finished products.

Technology and R&D Aspects

- Your technology will become more mature, you'll be able to make use of engineers as engineers in the true sense of the word, further improving your technology. Your way of managing people, especially engineers, will become more effective and efficient.
- You will be able to invest more efficiently on research activity.
- Research and development activities will be accelerated and will become more effective.
- Cycle of new product development will become shorter, and you will be able to produce quality of the world's highest standard.

Communication Aspect

- Understanding the concept of dispersion will permeate through all departments, and QC methods will be fully utilized.
- False data will disappear from your company or factory.
- You will have one common language, and will find it easier to communicate.
- Everybody will be able to talk frankly.
- Meetings will proceed more smoothly.
- There will be better relationships and smoother communication among different units of the company.

Aspect of Organizational Activation

- Humanity will be respected and human resources will be developed, turning the workplace into a cheerful one.
- You will be able to find capable people, and employees will be able to display

† What is important about dealing with suppliers, vendors or consumers is to identify what is the product to be transacted and at what price, and this is the basis of contracts. Here, product becomes clear only when its quality is determined, and enables going ahead with transaction.

their true capabilities.

- Human relationship will improve, resulting in better communication among departments/units.
- QC will enable streamlining of the entire organization of the company. Department/section managers, sub-section managers, and foremen will become more capable.
- Company-wide concerted efforts and collaboration will be a reality.
- Decision making will be faster, and policy deployment and target management will improve.
- Company constitution will improve.
- Your company will become a trusted one.

(6) Deming Prize

- Don’t apply for the Deming Prize just for getting the Prize. Apply for it for the purpose of promoting TQC.
- When you take up the challenge of applying for the Deming Prize, it will take only three or six months for you to do something you couldn’t do in three years previously. Make sure to take actions by accelerating the process.
- Take the opportunity of application to the Deming Prize to do something which you couldn’t do before. Implement reforms of your company.
- You will pass Deming Prize examination, if everybody looks satisfied with QC.

(7) Who are Involved in TQC?

All employees

- Quality control is part of work for every employee and every department/section. It will be successful if all employees and all departments/sections cooperate.
- QC is a team sport; it cannot be done by individuals. It requires teamwork and collaboration.

Top Management

- QC will not progress unless top management’s policy is well defined.
- Top management is responsible for demonstrating methods for evaluating quality as well as standards.

- Has my company been in such a dismal condition? (top management diagnosis)
- Unless the top management (President) or the second person at the top have good understanding of QC and take the lead in promotion, QC cannot be implemented, leave alone producing results.
- (To a top management member) On condition that you are committed to sticking to QC until the end under your own personal responsibility, and if you ensure to accompany me to all my consultation meetings, I will accept your request to help you.
- TQC promotion without leadership of the top management had better be discontinued.
- Conduct of top management diagnosis is an important element of TQC promotion, and I bet the top management will start enjoying it in due time.
- I simply don't understand who is responsible. Having said you have delegated responsibility to someone else, you are still interfering with the activity. This won't work.
- TQC will certainly be successful if everyone, starting from the president, operators to salespeople, cooperates. The top management should not scold when facts are reported.
- It is often said that when someone higher up in the head office visits the factory, people stop or hesitate giving opinions. TQC, however, is supposed to be implemented to break away with such a habit. It is important to create, at an early stage, an atmosphere where people can freely express themselves even in the presence of superiors.
- "Dr. Ishikawa, I think top-down system is a strict rule of TQC, and I think that's how it should be. If the top management is unable to personally find time for TQC for some reason, do you think the company cannot, or not qualified to, implement TQC?"

  "No, that's not true. I think in such circumstances, the No. 2 person should, or can take his place, although he and the top management should share the same view."

All Departments/Sections

- TQC should involve everybody from new product planning to consumers.
- TQC should involve everybody from sales to vendor management, raw materials procurement, to dealers (GWQC: Group wide Quality Control).

(8) Admonishment and Reprimand for TQC Promotion

Admonishment

- QC is not for us, the consultants, but for all of you to do.
- When you are about to start something, you will find your enemy in your own company.
- Your enemy is near you. (Refer to Section 7.2 Mr. Jiro Kondo)
- With TQC, it is normal to find that, of all the management members, 1/3 are for TQC, 1/3 are against TQC, and the remaining 1/3 are unable to make decisions.
- You should break free from craftsman's spirit, and start adopting scientific thinking and systems.
- With QC, you should not start with establishing general structure. First develop specific case studies and then move to general structure. This is how you can produce business effects.
- Identify and work on topics which can help improving vertical communication and breaking sectionalism and barriers among different departments at an early stage.
- Work out your own "shining example," that is, an outstanding feature of your quality control. Then, bring out good points one after another and gain confidence.
- If you carry out team activity, build teams with dedicated members. Take the plunge and leave the activity to them.
- Think how you can accumulate skills of individuals in your company, and build the structure which will allow you to hand them over to the next generation when you are promoted to higher position.
- It's natural that progress of improvement activity in a large organization is not uniform. If you hear the report saying that all the groups are progressing at the same pace, suspect there is something wrong about the report.
- When you perform 'boring' of individuals, don't blame them. Say, for example, when you do "boring" of Mr. A, don't say he produced defectives, and mention, instead, that defectives were produced in his area.

Note: "Boring": Original word is boring as you bore a hole. He used this word to mean performing in-depth analysis of issues for searching their causes.

- B How should we bring a horse to drink water which doesn't want to?
- Don't say you cannot implement TQC because you are busy. You will actually

find more time if you implement TQC.

- Researchers, engineers and designers! Be modest!
- If you want to improve something, do what is contrary to what engineers say you should.†
- Ungrounded confidence will impede progress.
- Those who jump on others for distinction will bring harm.

Reprimand

Note: Dr. Ishikawa strictly distinguished between "reprimanding" and "scolding." When I said I had been scolded by Dr. Ishikawa, he would say: "No, I didn't scold you. I only reprimanded you." What follows are his reprimands.

- There are two types of badness: one is badness of a system itself, while the other is badness of not following established rules and system precisely. It is important to correct the badness of not complying with rules first.
- This company has a strange behavior of people not following rules they established themselves midway, without any clear reason.
- Is this control document created for making it easier for subordinates to work, or for making it easier for superiors to scold the subordinates?
- The way data are collected here is for use by the head office to control plants or business establishments, and data useful and needed in analyzing facts and factors are not collected. I advise you to review the entire system of data collection, daily report and monthly report.
- Does the slow progress of improvement activity mean that you are not doing it at all?
- I wish you could tell me what you tried to do in the QC way as it is, instead of reporting to me what you did in a conventional way after organizing the result in the QC way.
- Although this presentation includes all the good results of activity, there is no mention of the process. It is totally unclear how the good results were achieved.
- Talk with story instead of history.

Note: He meant to say reporting should be done in logical order of issues, causes, countermeasures and effects, instead of just reporting a series of what people did.

† This is an expression he used in making fun of designers who designed a product without observing places of its use and caused troubles.

- Only the spirit of countermeasures is stated under the name of countermeasures. In working on countermeasures, you would end up in having motto without substance, unless you work out a concrete implementation plan and go ahead acting on it.
- You should implement good ideas much earlier without any delay.
- QC secretariat should not continue to repeat doing the same thing. They should have more varied experience and broaden their horizons.

(9) Misunderstandings concerning QC and TQC

- QC consists of conducting inspection rigidly.
- QC is to standardize.
- QC is to prepare control charts.
- QC is science of statistics.
- QC is to study something difficult.
- QC can be left to the inspection section.
- QC is the task for Quality Control Section.
- You can leave QC to the plant.
- QC can be done by production shops (workplaces).
- QC is not for indirect sections.
- QC is costly.
- QC is unnecessary because we are making profit now.
- You are doing TQC if you are carrying out QC circle activity.
- QC activity is equal to QC circle activity.
- It would be sufficient if you are doing QC circle activity.
- We don’t need QC circle activity in our company.
- QC is nothing to do with me.

16.3 What is Quality Assurance?

(1) Message to Consumers

- Tolerating poor quality is a vice of consumers.[†]

[†] This means that it is not good if consumers remain silent without complaining when they find products they purchased are defective.

- Buy cheap things and waste your money. Buy newly launched products and waste your money.††
- Don't buy newly developed products.
- QC in Japan starts from women.†††

(2) Quality which Satisfies Consumers

- It's consumers who give us work.
- Produce products by putting yourselves in the shoes of consumers, because, sooner or later, there will be a shift from the seller's market to the buyer's market.
- Consumers are not guinea pigs.
- Your cake may taste delicious to you but not necessarily to your consumers.
- Consumers are kings, but many of them do not have eyes to observe. Although it is the duty of salespeople to train them, some cannot do so effectively because of their insufficient product knowledge.
- The first step of QC is to understand what consumers desire to have.
- The first step of quality is to understand what consumers desire to have.
- The first step of quality control is to identify what you want consumers to buy.

(3) Basic Philosophy

- Quality assurance is the goal and essence of TQC.
- QC is not worth its name unless quality is assured.
- Quality assurance is the responsibility of producer (seller, production department, workshops), and not of buyers or inspection department.
- Losing trust takes only one day; Winning it may take 10 years.
- Quality assurance essentially involves, 1) presenting a document (such as specification), demonstrating the producer's commitment to production of a product complying with such document, and 2) then delivering the product which complies with the document. It does not mean, 1) producing a product first, 2) testing the product and find its actual characteristics, and then offering

†† This means that, it is the same as losing money if you purchase cheap products which you don't like (or products with poor quality); likewise, it is the same as losing money if you purchase newly developed products and find them not quite good, new products being more likely to cause troubles.

††† Just as chefs' skills are polished by gourmands, product quality is refined to better level by sharp feedback of consumers. In other words, demanding comments/ feedback of women (housewives), who are representatives of consumers, polish Japanese products and improve quality.

a document which describes the testing results/characteristics.

(4) How to Work on Quality Assurance

- The next process is your customer. (created in 1950)
- It's important that you carry out your work based on the belief that the next process is your customer, and therefore, you should not cause trouble to your customer.
- Make sure to improve quality, and after that, move on to reduce cost. This will finally lead you to reduce the delivery time.
- Make sure to rotate PDCA for quality, so that you may keep improving quality.

(5) Quality Design and Product Specifications

- Have a long-term quality target.
- The first step of QC is efficient quality design.
- You cannot define quality without thinking about price.
- Enough research has been carried out on "manufacturing" and little or no research has been done on "use" of the product. If you vigorously investigate and research on how users (consumers) use the product, application of the product will improve, and the market will expand.
- Aren't you going after excessive quality? Once, there was a chemical plant, where people's quest for excessive quality led to unusual increase in the number of instruments and meters in the plant, leading to deterioration in the overall plant's performance.
- If you see JIS, don't think it is true; if you see product specifications, don't think they are true; if you see raw material specifications, don't think they are true; if you see tolerance, don't think it is true; if you see measuring instruments or chemical analysis data, suspect it.[†] (Refer to Section 3.3 Mr. Tatsuo Sugimoto)
- Are you comfortable if that your product meets its specification?
- Although some product standards are established by a country and by specific environmental conditions, don't you think that what is truly needed are globally acceptable common product standards?

[†] Don't accept JIS, product standards, raw material standards or tolerance as they are trustworthy. You should use them only after investigating appropriateness for customers' requirements, usage conditions, etc.

(6) Build Quality into the Process

- If you declare you perform 100% inspection, you are virtually declaring that your products include defective ones.
- Quality control with emphasis on inspection is old-fashioned way of quality control.
- Build quality into the process.
- Build quality into the design and process. Quality cannot be built by inspection alone.
- Process control will reveal actual conditions of the workshop, enabling the process to display its full capability, thereby helping to establish and improve technology and allowing better design of the process.
- Full capacity of a process can be displayed only when the process reaches the controlled state.
- Don’t mix up inspection and control (process control).
- Because people know that their boss will be upset when he finds defectives, they tend to hide the defectives.

(7) Service and Quality Information

- For how many years-worth spare parts does your company hold for after-sales service support?
- Life-time supply!
- Do you have a system of collecting and analyzing used products of your company for improving quality? A great deal of valuable quality information can be derived from the used products.
- No matter how good quality information you may have, it is meaningless, if it is not communicated in time. Devise a system for communicating information to relevant departments/sections, as quickly as possible.

(8) Complaint Handling[†]

- Number of complaints and defectives increase rapidly as you initiate quality control.
- Work on reduction of complaints by rotating PDCA cycle. What is important is the extent of reduction in the complaints and the kind of activities conducted to reduce these complaints.
- The key is how you can best reduce unknown causes of complaints. Complaints related to "unclear cause" and "no trouble found" should be reduced to 5% or less of the total number of complaints.
- Bring latent or hidden defectives and complaints to surface.
- If you have one apparent complaint, you have at least 100 times more latent or hidden complaints.
- Don't you hear complaints even when your product meets its specification?
- Don't you hear complaints about your product concerning items not included in its documented specification?

16.4 Control and Standardization

(1) Basic Philosophy

- Objective and actual practice are important. (Refer to Section 4.4 Mr. Hiroshi Odajima)
- TQC is control based on facts.
- Understand "*Genjitsu*" (reality) and "*Genbutsu*" (actual things). (Refer to Section 4.4 Mr. Hajime Makabe)

[†] Customers' feedback consists of two types: one which requires repairs, rework, return (which involves refunding of price paid), compensation, etc. and the other which simply conveys customers' complaints without specific claims or demands. In Japanese, there is a general word "*kurehmu*," which is used more frequently to refer to the former, and where it is necessary to distinguish the latter from the former, another word "*kujo*" is used. Considering the context in which Dr. Ishikawa used the word "*kurehmu*" (as shown in this book), that he used the word conceivably to mean the former.

A professional translator, however, points out that, in English, the word "complaint" is the general term, and only when you specifically refer to the former, the word "warranty claim" may be used. In line with this idea, "*kurehmu*" should be translated as "warranty claim," but it was translated as "complaint" instead. It is because the way how Dr. Ishikawa used the word rendered plainer tone with wider meaning than when the word is used in more specialized discussions within the quality assurance department, and therefore, "warranty claim" may carry too grave a significance killing the plain tone of Dr. Ishikawa.

- Control must be conducted comprehensively for QCDS.

Note: QCDS: Acronym of Quality, Cost, Delivery and Safety.

- You cannot standardize or control effectively without intrinsic technology.
- We must carry out effective TQC to control quality, which is its prime objective, through employing means of intrinsic technology, statistical technology, and control technology.
- Rotate PDCA cycle for every type of work.
- Rotate PDCA of quality for every type of work.
- Control every work process.
- You can carry out major improvement only when sufficient control is implemented.
- When you try to control, a natural course of event would be improvement, and when you try to carry out improvement, a natural course of event would be good understanding of importance of control.
- Control and improvement are like two wheels of a vehicle.
- Understand the difference between control and improvement.
- A company, factory, or process where control is not implemented, is not in a controlled state without exception.

(2) Points of Control

- If you don't check the result of your plan, order or action, you are leaving things incomplete.
- Define who needs to check what.
- Understand the difference between causes and results.
- There are only two or three major factors giving impact on work (process).
- Control charts and graphs should be used by leader at each level of hierarchy.
- Control without any check is an ideal control.†
- Think always about actions. Without actions, what you are doing is only a hobby.
- If an incident repeats for the same cause, then control is not being implemented.
- Eliminate causes rather than phenomena, and moreover, eliminate root causes

† If you can establish "Plan" step perfectly, while implementing PDCA, and "Do" step is carried out exactly as planned, "Check" step will eventually become unnecessary. Such a condition is an ideal state of control.

to prevent recurrence. (Refer to Section 3.2 Mr. Masumasa Imaizumi)

- Don't mistake "elimination of abnormality cause" for "adjustment."
- First of all, each individual should rotate his/her own PDCA. In doing so, he/she should take measures to prevent recurrence without fail, rather than following an old-fashioned way of addressing only the symptom, i.e. rushing to take immediate measures to act on the result and accept the action if the result is acceptable. In other words, improvement activity should become part of daily work and daily control.
- Be proactive in controlling.

(3) Approach to Standardization

- Standardization is carried out for the purpose of delegating authority.
- Standardization enables delegation of authority, allowing the top management and executives to have time to think about future plans and policy, which is their most important duty.
- Standardize technology so that you may accumulate technology organically in your company.
- Standardization is not only for quality control. It involves establishing standards for managing the business well as well as for all employees to enjoy their work with comfort.
- Don't mix up objective and means.

(4) Points of Standardization

- Start planning for QC and standardization simultaneously with a plant construction plan.
- Involve people of relevant sections for SOP (standard operating procedure) as far as possible. Human nature is such that people abide by standards and rules they established themselves.
- Standardization is a duty of engineers. In Japan, there is general shortage of engineers who work for standardizing office operation.
- Standardization without needs or clear objectives tends to become ritual.
- By saying that you can't standardize and that human skills are important, you are implying that you don't have technology in your company.
- Standards which do not produce effects are ceremonial standards. Prepare

standards which can produce effects.

- A standard which is not revised after six months of its establishment, indicates that it is not in use.
- The fact that standards are not revised demonstrates that your technology has stopped progressing.

16.5 Problem Solving, Statistical Method

(1) Problem Solving

- When you think you have no problems, you will stop progressing, or rather, you will slip backward.
- Unless you have good understanding of problems and objectives, you cannot solve them.
- When problems and objectives become clear, your problems are half solved.
- Identify important problems, and make a focused attack on them together with others.
- There are few important problems, while there are many trivial problems. (A Japanese way of expressing "Vital few, trivial many," words of Dr. Juran.)
- Saying that you have no problems or that you have many problems in your company implies that, in either case, you don't understand what a serious problem is all about.
- Engineers should tackle tasks which will yield 100 million yen or more per year.†
- Understand the reality of the problem first, rather than wondering what its cause may be. The first step of problem solving is to understand the existing conditions.
- Giving up is an enemy to improvement, enemy to progress.

(2) Data

- If you look at data, assume that they are false. (Refer to Section 7.3 Mr. Katsushi Ogawa)

† Editor's note: Editor heard this repeatedly since he was in the graduate school (mid-1960s). In terms of the initial salary of engineers newly graduated from universities based on the value around the year of the publication of this book, this figure would be around 500 million yen. (Noriaki Kano)

- If you look at data, think they are not trustworthy. (Refer to Section 7.3 Mr. Nobuyoshi Takamatsu)
- Basis of control is correct data and correct information. Eliminate false data.
- You collect data for using them and for acting on them. Stop taking data which do not lead to actions.
- If false data are generated in a workplace, it is the responsibility of the manager.

(3) Process Analysis

- If you do not conduct sufficient analysis and if you do not have firm technical knowledge, you cannot carry out improvement or standardization, nor can you perform good control or prepare control charts useful for effective control.
- You cannot conduct QC well without having intrinsic technology. The driving force of finding factors is research, technology and skills (experience, expertise). You can develop your technology rapidly by using statistical methods with QC sense in quality analysis and process analysis.
- You cannot perform standardization or control well without conducting process analysis.
- You cannot perform process control well without solid process analysis.

(4) Statistical Methods

- Dispersion exists in any kind of work.
- Statistical methods are a common practice of engineers of tomorrow.
- Investigation based only on intrinsic technology or experience is like travelling from Tokyo to Osaka by rickshaw. In contrast, if you combine them with statistical methods, it is like travelling the same journey by bullet train.
- You cannot perform good quality control without knowing statistical methods.
- You cannot perform good standardization or control without statistical techniques.
- 95% of problems of a company can be solved by simple statistical methods.
- Pareto chart and cause and- effect diagram can solve majority of issues.
- You cannot perform good control or analysis without good stratification.

(5) Control Charts

- Quality control starts and ends with control charts.[†]
- SOP (standard operating procedure) and control charts are two sides of the same coin.
- Control charts do not exist for checking people. Rather, they are to be used for helping people to work successfully with ease.
- Control determines predictability and reliability.
- Statistically controlled state is a basic issue of reliability.
- Inability for using control charts is caused by the lack of true process technology or insufficient process analysis.

(6) Process Capability

- Study of process capability (quality) is a basis of quality control.
- How can you perform quality control without knowing process capability?
- How can you design without knowing process capability?
- How can you develop materials specifications without knowing process capability?
- If you conduct research on process capability thoroughly, the capability can improve by a factor of ten.

16.6 TQC promotion

(1) Organization

- Quality control requires streamlining of organization.
- (Defining) organization is to clarify responsibilities and authority. Organization doesn't simply involve setting up sections and groups. While authority should be delegated, responsibilities cannot be delegated.
- Controllable size is 100 persons. One can control up to 100 persons. (Conductor of an orchestra)

[†] Quality control starts from understanding presence of out-of control process through preparation of control charts. And then, you can go on to pursue the cause of out-of-control process, achieve sufficient process capability for the realization of product specification, and finally, you can confirm by control charts that the process capability is achieved in the stable process.

- If you conduct quality control, you can demarcate line and staff functions clearly, establish engineering department and true technology firmly, and export technology.
- When a problem occurs in a work area, one-third to one-fifth of its responsibility lies with the work area, while remaining two-thirds to four-fifths lies with other areas.
- Generally, when people of one work area make a mistake, only one-fourth to one-fifth of its responsibility lies with the people at the front line, while three-fourths to four-fifths of responsibility lies with their management.

(2) Education

- QC starts and ends with education.

  Note: It was the title of the lecture given in commemoration of Dr. Ishikawa's receiving the Grant Award from the American Society for Quality Control (ASQC) in 1972. (1972, [22])

- QC will fail if everybody misunderstands it; it will succeed if everybody understands it properly.
- Education should be continued forever as long as the company continues to exist.
- Implementing quality control requires brainwashing every employee.
- For implementing QC, persistent effort in educating everybody from the president to every worker is necessary.
- If people don't understand what they are taught, it's because the method of teaching may be poor.
- In human resource development, more outstanding result can be expected from OJT given by competent leaders, or through delegating authority to people in developing new products, than through classroom training.
- In the new age, developing multi-skills would be necessary not only in the production lines, but also among managers, staff and female clerks.

(3) QC Circles

- Human beings are human beings.[†]

[†] QC activity should be carried out based on the idea that everybody is human, irrespective of differences in nationality, in positions held, such as workers or managers, or in ways of thinking.

- There is no TQC activity without QC circle activity. QC circle activity is a part of TQC.
- QC circle activity cannot be kept active for a long time unless QC circles are promoted as part of TQC.
- Enjoy the fun of holding QC circle activity.
- QC circle activity and QC team activity are two different things.
- Although I used to think that QC circle activity is possible only in countries with Confucian philosophy, such as Japan, Korea and Taiwan, I have come to believe, however, that it is possible everywhere in the world irrespective of religion or ethnic group.
- Don't tell me that the fire of QC circle activity has gone out in your company! Realize again the importance of QC circle activity as part of human resource development. (Mentioned in relation to the fact that there was no presentation of QC circle activity among presentations made by the Human Resource Development Committee.)
- You are a baby if you don't have autonomy.
- You are doing TQC if you are doing QC circle activity. (Misunderstanding)
- You think that QC movement is equal to QC circle activity. (Misunderstanding)
- You think that QC circle activity is labor management. (Misunderstanding)

(4) Department/Section Managers

- Preparing atmosphere for trusting each other is a prerequisite of management. Management based on the theory that all human beings are good by nature.
- Management based on the theory that man by nature is evil is costly in the first place, and besides, it makes everyone unhappy—Duplication of management.
- Unless you capture department/section heads, you cannot take QC forward.
- With regard to TQC, department/section heads often make troubles.
- A manager (or an engineer) who cannot manage his/her subordinates is doing only a half share of his/her work. I will call one a full-fledged manager (engineer) only when one becomes capable of managing one's boss and other departments/sections (when other people start working as one tells them to).
- Managers shouldn't blame their subordinates for their fault; managers themselves should bear responsibility.
- Leave work to your subordinates, and you will find them demonstrate their

capability.

- Have ears to listen to others rather than giving mouth to your opinions.
- Don't give a reason why you can't do something. Think positively about how you can do it.
- To err is human. Don't be upset about mistakes of your subordinates.
- Neither people will grow, nor can they generate new products or new technology, if you accuse them of their failures without appreciating their success (bureaucratic). Remember failure teaches success.
- Front-line people know facts best, but they may possibly be biased in judging the facts.

(5) Policy

- Management without goals or objectives is impossible.
- Standardization can progress and management can be conducted only when management policy is defined.
- All leading positions should have policy.
- Appropriate policy can be formulated only if an appropriate information is available.
- Are your policies and plans concrete? Are measures of evaluation available?
- Is your method of policy deployment and communication appropriate?
- Are higher level policies and lower level ones linked properly? Are policies consistent through to the end?
- Are policies communicated to the end?
- Do policies get more concrete as you go down the organization?
- Think how you can hit the stone bridge as you cross it, and with speed.[†]

(6) Cross-functional management

- Is this cross-functional committee working properly recently? Hasn't it got into a rut?
- I find sometimes that what should be done by the cross-functional committee(s) and what should be done by vertical organization are mixed up. Learn more about what should be done by cross-functional committee(s).

[†] While you should be prudent in checking the bridge by hitting it with a stick as you cross a robust-looking stone bridge (a Japanese proverb meaning you should be extremely cautious), it does not mean you can take any amount of time. You should also think about the speed of crossing.

16.7 TQC Implementation for New Product Development, Manufacturing, and Marketing

(1) New Product Development (NPD)

Philosophy of NPD

- QC and quality assurance of new product development is the essence of TQC.
- In developing a new product, enemies exist in your own company. (Refer to Section 3.2 Mr. Masumasa Imaizumi)
- Corporate constitution determines whether or not new product development succeeds.
- A company's TQC is fully matured if its new product development project moves on to full-scale production on schedule, its straight go-through rate and production volume start up steadily, its sales grow steadily, and no complaints or problems are heard from the consumers.
- When any of your new products launched are successful and consumers begin to say that they are comfortable in buying your new products, your company's QC is fully matured.
- Make the first move in coming up with a new product. If you are a second player in developing a new product, it is a me-too product.
- Unless you are careful, new product development projects are likely to move ahead as slow as a maiden in the beginning but as fast as a running rabbit at the end. If you make steady moves in the beginning, you will be able to take time in the later process.
- Designers should get rid of arrogant attitude that designers are artists and are at one level higher than other engineers.[†]
- Proportion of entirely new parts in a new product would be around 10% of the total. Some issues about new parts are inevitable. But the remaining 90% of parts remain unchanged. You should not allow those old parts to cause problems.
- A key to the success of new product development is to let the "pus" get out at an early stage of the project.

[†] What designers differ from engineers working in purchasing, manufacturing, sales, service and other departments is only in their functions, and the idea that engineers working in specific departments are more superior or inferior to others is wrong.

Product Planning

- It is very important to conduct strategic new product planning, which involves the sales department identifying potential needs proactively, R&D department accumulating prior research, and combining the fruits of the both to develop a new product ahead of others.
- You should not judge whether new product planning was good or bad by sales of the product alone; you should base your judgment on whether or not the product satisfied the target customers.

Design

- Design a product by putting yourself in the shoes of its user.
- Don't complain that you did not expect a product to be used outside of your intention.
- In designing a product, think out and investigate well in what conditions it will be used.
- In design work, conduct QC, thinking design process is a multi-variety small-lot production process whose product is drawings.
- Promote standardization of design and develop standardized parts.
- Prepare drawings which enable production in which straight go-through rate is 100% and which does not require adjustment during production.
- You cannot perform good design work without knowing how the product is going to be manufactured.
- Design without consideration of manufacturing method is not a design.
- Determine tolerances statistically, and determine safety factors statistically.
- It is advised that accumulation of technology in a design group be done through collaboration of various functional champions.
- Accumulation of technology will be accelerated if failure cases are included, and the technological knowledge built would be not only that of individual designers but also that of the organization.

Drawing Errors

- The first point in minimizing errors in drawings is to reduce the number of drawings to be prepared to a minimum, and the second is to discover errors at the earliest possible time. It would be hard even for experts with rich experience to check and eliminate every error in the drawings at a later stage.

- If you drew the new design, any problems would happen, some errors and increasing the number of parts. Reduce design man-hour to one-fifth. (The same applies to the development of software.)
- Checking drawings will naturally incur cost, but it will be cheaper than generating unacceptable products.
- You cannot truly prevent recurrence of design defects unless you reach a stage where you realize and regret why you could not identify them during the development process.

Design and Cost

- Design which does not take cost into account is not a design.
- On condition that candidate materials have the same performance and same reliability, use as low-grade material as possible (VE).
- If your product planning is conducted with a focus on cost reduction, the product will not sell well. You should opt for selling it at a higher price by improving its quality.
- An engineer must be an economist.

Prototyping

- A wrong thinking has taken root that prototypes are acceptable if they function properly. That is not right. What should be done during prototyping is to bring “badness” to the surface.
- Produce three units of a prototype, and then, let the R&D department, manufacturing and production engineering department, and sales department examine one each. This way, “pus” of the prototype may be let out thoroughly from multiple/perspectives.
- Are the prototype and drawing(s) consistent?
- Don’t let competent person test a prototype. Let a layman perform the test in poor or rough way, so that you may identify shortcomings and weaknesses at an early stage.
- A point of primary prototyping is to check if the prototype and drawings are consistent as the prototype is manufactured. What is observed often is that, although a part was filed during the assembly process as an additional step, it was not reflected in the drawing.
- You come across more often than you expect with cases of inconsistency between design drawings and prototypes.

- With regard to troubles which surfaced after mass production trial stage, it is important to examine at which step such troubles should have been identified/detected. You should be able to detect at an earlier stage the next time, that is, those found during the mass production trial should be identified at the secondary design review, and those found during the secondary design review should be identified at the primary design review.

(2) Production

- Production is carried out by people without knowing what kind of product they are producing.
- If a company depends entirely on skills, it means the company does not have any technological accumulation.
- The key is to standardize every technically definable area, and leave what cannot be standardized to the skills.
- You can increase the size of a lot if you want, but from the viewpoint of control standard, an appropriate lot size would be half-a-day to one-day worth of volume.
- QC would be successful only when you reach a stage where foremen and, furthermore, workers begin to take responsibility of their own processes.
- Why do I see a file in this assembly process? Is it there for reworking defective products?
- (Looking at a disorderly condition of production floor) Is this a warehouse? Are you producing products in a corner of a warehouse?
- You don’t find your defectives going down because you are concentrating on Kaizen and not doing true control.
- Regard all cases of rework as defectives.
- Remember that 15% of responsibility of defective products lies with the workshop, and the balance is the responsibility of the management.
- In my experience, what is adjusted (during assembly) will cause a trouble later. A product should function properly as it is assembled, and if adjustment is needed, it is either because of poor design or defective parts.
- 70% of responsibility of unsuccessful outsourcing management lies with the larger company (the one placing orders).
- If your business partner (supplier) is an expert in his field, you should let him give his opinions freely. It would be more effective for you to give

solid QC training to the partner, rather than inspecting their products (parts) rigorously on delivery.

(3) Sales

- Sales department is entry and exit of TQC.
- Unless sales personnel acquire QC sense of mind, the company will not grow.
- Sales people think they have nothing to do with TQC, and therefore, they do not understand TQC or QC.
- You won't need sales department if you just want to sell your products at low prices. Sell your products for their quality.
- Sales planning staff should have both good QC sense and good marketing sense. Lacking in either one would disqualify one for the job.
- Think what makes good sales personnel.
- I hear the word "good sales personnel" often. What do you mean by "good sales personnel" in your company? Will you call somebody a good sales person only if he/she has good sales performance?
- Are your PR materials designed to have your customers (consumers) buy your products, instead of just imposing product information on them?
- How many new product development proposals in the true sense of the word did sales department make and succeed?
- Sales personnel should never use the word "absolutely safe."

16.8 Overseas

- When you operate overseas, make sure not to force the Japanese way of working to the local people. It is important to adopt ways suitable to the nature of the local people and regional characteristics.
- Do you know to what extent your effort was effective in improving the ratio of locally hired people retained with the company?
- The top management of the local subsidiary is always thinking about Tokyo as they work. The idea that everything is OK if Tokyo (head office) makes money is not acceptable. Conduct management which will be well accepted by the local people.