

**Method for Creating Wisdom from Knowledge**  
**-For Task Realization and problem solving-**  
**-DTCN (Design to Customers' Needs) Methodology-**  
**2009 Edition**  
**(Rev.1, added Appendix 3, at 2011-11-13)**  
**with executive summary**

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Executive summary  
of  
'Method of Creating Wisdom from Knowledge'

**-For Task Realization and problem solving-**

which **also prevents hit-and-miss at problem solving.**

## Executive summary of the 'Method of Creating Wisdom from Knowledge' which also prevents hit-and-miss at problem solving.

Written by Michihiko Esaki (2011-7-25) Rev.1

(The executive summary only page can be downloaded from <http://dten-wisdom.jp/00001-E-exec-summary.pdf>)

In order to fully understand the following explanations, questions and answers it is necessary to glance through the 'Method of Creating Wisdom from Knowledge'

(To purchase of this book can be made from Amazon, it is necessary open URL bellow

[http://www.amazon.co.jp/gp/switch-language/product/4889190279/ref=dp\\_change\\_lang?ie=UTF8&language=en\\_JP](http://www.amazon.co.jp/gp/switch-language/product/4889190279/ref=dp_change_lang?ie=UTF8&language=en_JP) and the catalog is found at <http://dten-wisdom.jp/00001-R3E1.pdf>)

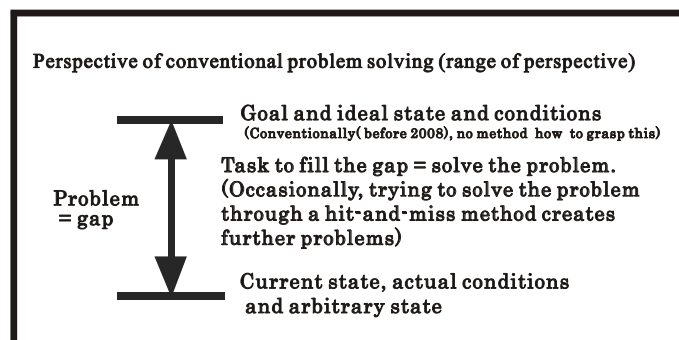
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If you wish to create a version of this book which is more aligned to your country mindset, please contact the translator of this book at Chris C. Nishihama [jccompassion@yahoo.co.jp](mailto:jccompassion@yahoo.co.jp)

### Explanation 1 (Esaki):

Grasp the ideal state for problem solving

#### Diagram 1: Conceptual diagram of a conventional problem solving method



In the conventional problem solving method, the difference (hereafter called 'gap') between the ideal state and conditions (physically realizable range) and actual states is bridged by solving the problem. Selecting what to 'fill in' this gap with had been done with 'Decision Making' (H. Simon and others). However, the method to logically grasp this ideal state or the rational way of filling in this gap were vague.

In addition, there had been no definite method utilizing the upper purpose for the ideal state and

conditions.

As well, there were no explanation concerning the classification of the words 'goal' and 'purpose'.

If a diagram of problem solving were drawn up, it would look like the following diagram 1 and 2.

### Question 1 (Esaki):

After grasping the ideal state, was there a conventional method that explained how to fill in the gap?

### Answer 1 (reader):

I believe there were almost none.

### Explanation 2 (Esaki):

After grasping the ideal state, the method of filling in this gap (which is physically realizable) is the 'Method of Creating Wisdom from Knowledge'.

This method can be started by the 'Method of replacing the problem with the task'.

After the task is established, the 'Purpose Measure Diagram' (PMD) is made and the 'Main Keyword' is grasped. (Details on the PMD concept can be found in this book 'Method for Creating Wisdom from Knowledge'.)

The result of the Main Keyword is made as the result of the upper purpose and it then becomes the target. If both the 'Purpose Measure Diagram' which indicates the Direction of Will and the 'Main Keyword' which shows the realization action level in the Direction of Will can be grasped, then it can be said that it was 'Will Decided'. (The method of making a PMD is indicated in this book 'Method of Creating Wisdom from Knowledge' (Page 36~64) .document.)

Next, in order to realize the 'Will Decision', one needs to find an expression which tells where to start.

This expression can be found easily at the bottom of the Purpose Measure Diagram and it will become the Entrance Keyword.

In addition, if one goes further with this Purpose Measure Diagram, the expression 'make a Purpose Measure

**Diagram'** will normally appear below it.

When the **'Main Keyword'** is made as the 'Key', by using the FBS technique found in the method of creating wisdom from knowledge, the contents of the target of the purpose result can be clarified (the ideal state and conditions). The FBS (Function Breakdown Structure) technique will be used as the method. (Page 110~125)

Three extreme proposals are then created and the most suitable proposal will be found to lie somewhere between them. By conducting the 'Creation of a comparison proposal of the first level and task optimization of the evaluation, selection and judgment', the basis of the Basic Idea (proposal) of the purpose can be made.

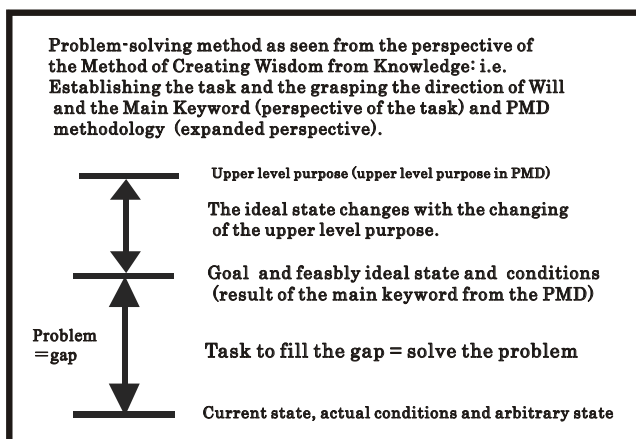
Next, using the **'Steplist method'** (method of creating the procedure) found in the **Method of Creating Knowledge from Wisdom** the induction approach made in the 4 phases will phase and refine the most suitable proposal that was first made and the basic idea (proposal).

Then, in the following phased procedure of the deduction approach, that proposal will be realized in the actual world.

Here, what is important is to confirm the upper target of the ideal state which is indicated in Diagram 2.

Diagram 2 shows the basic image.

**Diagram 2: Grasping the ideal state (Main Keyword) and confirming the upper purpose.**



The problem and task positions are interchanged and while clarifying the **upper level purpose**, the **upper level purpose** is clarified by **making a PMD**. (Details on the PMD concept can be found in this book 'Method for Creating Wisdom from Knowledge'.)

In this diagram, it needs to be recognized that when the **upper purpose** changes, so will the ideal state and conditions. As well, when the lower level means (especially idea) changes, the **scope of the upper level purpose** will become broader.

**Comment 2 (reader):** Indeed,

### **Explanation 3 (Esaki):**

In addition, words or mindsets that were conventionally known but ambiguous are explained by using the **Method of Creating Wisdom from Knowledge**. (See each pages bellow)

- (1) Regarding problem solving and task realization (Page 18~21)
- (2) Proper use of the questions "To do what?", "How to do it?" and "Why?" (Page 22~23)
- (3) Method of vector-aligning the parties concerned. (Page18)
- (4) Relationship of the target (especially the upper level target) and purpose (Page 159~160 and this document)
- (5) Difference between knowledge and wisdom (Page 152~153)
- (6) In verification, there are two parts: Verification and Validation. What are the differences in their meanings? (Page 76)
- (7) What needs to be done in order to have said an evaluation was conducted? (Page 76)
- (8) Judgment mechanism by way of **Will Decision** and Information of Difference. (Page 121~132)

### **Comment 3 (reader):**

I see. By using this method, things which were ambiguous or their explanations insufficient can be clarified.

### **Question 4 (reader):**

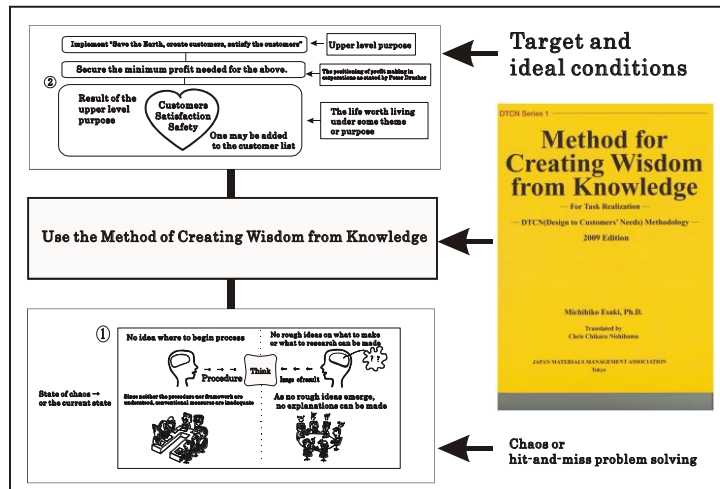
Can you further explain the structure and contents of this method?



#### Answer 4 (Esaki):

The following would be the diagram of the above-mentioned ideal state if the method for creating wisdom is used on the purpose and means relationship in order to realize it.

Diagram 3 : Position of the "Method of Creating Wisdom from Knowledge"



Please view the above **diagram ①** as being the '**chaotic**' state when considering where to begin. (Conventionally, one does not know how to prevent a hit-and-miss situation in problem solving when there are no background information in new situations.)

**Diagram ②** is an image of the ideal state with the upper target included.

What fills in the gap is the '**Method of Creating Wisdom from Knowledge**' which also incorporates measures to prevent a hit-and-miss situation.

Also, in business the basis of the upper level purpose which creates profit for companies or

individuals lies in 'Save the Earth, create and satisfy customers'.

This methodology allows for the minimum amount of profit (which includes measures for risk).

When this rule is not observed and acquiring profit becomes the upper purpose, a great problem like the bankruptcy of the Lehman Brothers may occur.

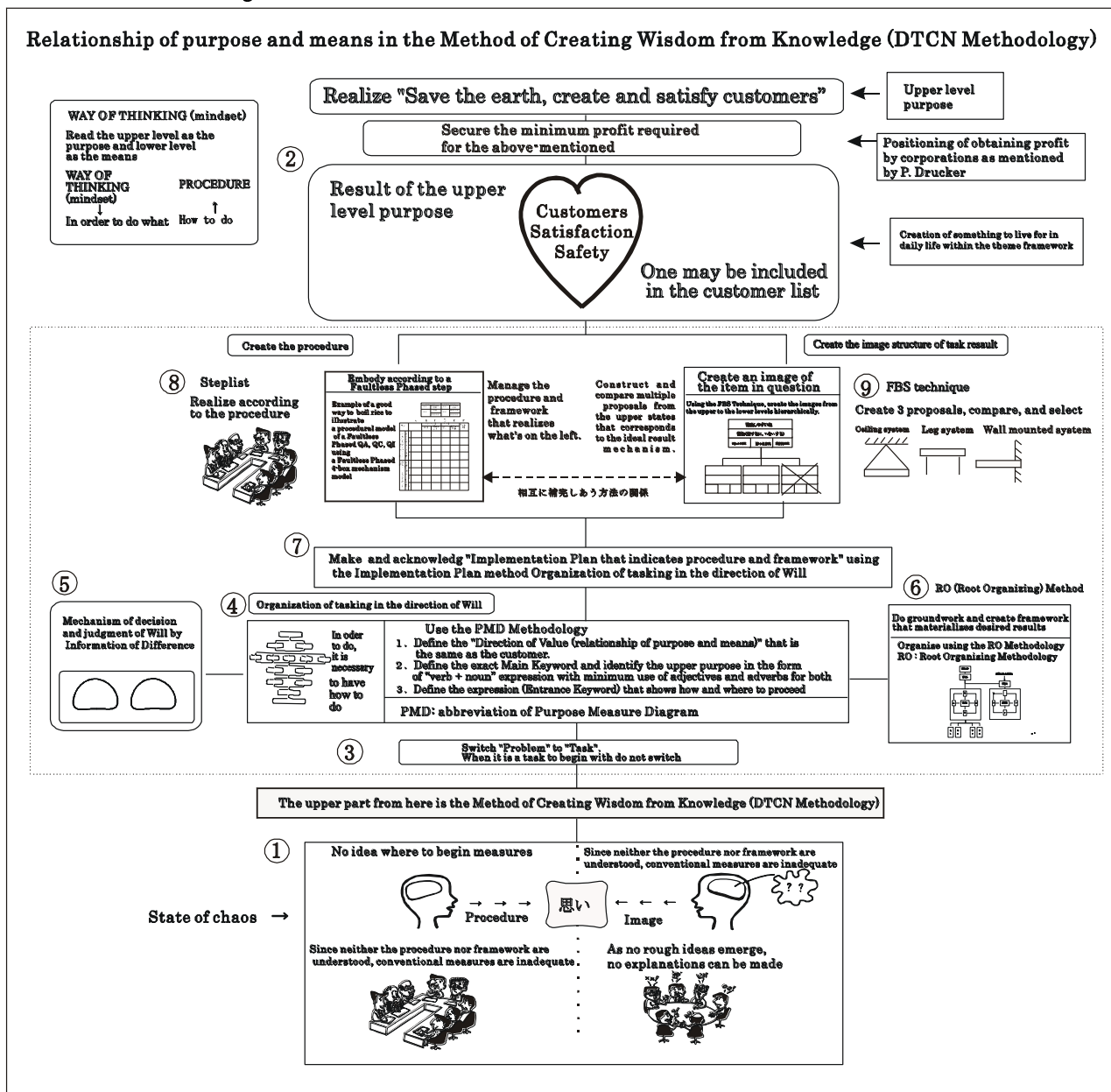
In the case of ①, this shows the procedure where it may not be possible to know or have a vague idea what needs to be done in order to obtain such a result.

Also, it shows the typical chaos that would exist in problem solving as the framework may not be known and even through free discussions by scholars, no ideas or proposal may be drawn.

Here, a rational procedure would be needed in order to prevent a hit-and-miss problem solving situation.

To incorporate such a rational procedure it is necessary to switch the problem to become the task and to **Will Decide** in order to create an idea and realize it. Diagram 4 shows what the overall outline would look like.

Diagram 4 "Fundamental diagram of the relationship between purpose and means in the Method of Creating Wisdom from Knowledge"



After grasping the ideal state (including development of completely new things and systems), it is necessary to come up with wisdom to fill-in the gap (difference).

This can be made through the **Method of Creating Wisdom from Knowledge**.

The following is an explanation of the outline.

#### Explanation 5 (Esaki):

In Diagram 4, the 'Basic outline of the relationship between purpose and means found in the **Method of Creating Wisdom from Knowledge**'.

The method found within the bold broken line is the **Method of Creating Wisdom from Knowledge**.

Places numbered ①, ② and ③ will be further shown in detail and explained.

As explained at the top of the diagram, one needs to read from top to bottom with the segment "In order to ..." added to the upper statement so that the purpose and means relationship is reversed.

Furthermore, to confirm the validity read from the bottom to top by adding the segment "And then ..." to the upper

statement. By doing this, a rough procedure or a conditional layer can be seen to exist.

**Question 5 (Esaki):**

Can you properly explain the difference between knowledge and wisdom?

**Answer 5 (reader):**

Both knowledge and wisdom are similar, but I cannot clearly explain their relationship.

**Explanation 6: (Esaki):**

**Knowledge contains** 2 information.

One is the cause-effect relationship (what happens when something is done) and the other tells what thing (mechanism/component) that is included.

**Wisdom contains** 3 information.

One concerns with what needs to be done in order to achieve something.

This includes the **Will** to attain the exact desired results.

Two deals with the procedural information of materializing the desired results.

Three is information concerning what things/system can be most suitably realized from the result.

The following is a simple example illustrating this explanation.

● To 'Have knowledge' means having the following two information.

① Having the cause-effect relationship information.

② Having information concerning what exists (including knowing the internal mechanism/components). For instance, knowing that a glass cup would break if dropped is having the cause-effect relationship information. This requires one to know the existence of the glass cup including its material and components.

● To 'Have wisdom' means to

① Have Will when wanting to do something.

This indicates having the 'Direction of Will' by repeating the purpose and means relationship from the upper level purpose 'in order to...', 'do...', and grasping the 'Main Keyword' found near the middle which summarizes the 'Will'.

(note) This method is different from those conventionally used by organizations that expresses 'Will' as the 'Target'.

② In order to realize it, if the 'Have information on the procedure 'How to do it?' and

③ 'Have information on what results will be brought about for certain mechanisms and components' are used, there will be 3 information.

For example, if one had '**Will**' and wanted to use a piece of broken glass to shave one's beard, one would drop the glass or to insure that it would break, throw it up in the air and let it drop onto concrete (information concerning the procedure on what to do).

Also, as a result one would choose the broken glass with the sharpest edge (to know the result and structure/component).

**Comment 6 (reader): Indeed,**

**Explanation 7 (Esaki):**

This wisdom will combine the knowledge and hidden knowledge that we have together with the external knowledge that can be acquired in a physically realizable sequence. By combining these knowledge, the prospects of success can be weighed while wisdom is being created. Moreover, if this method is not used, it cannot be created. In the book "Method of Creating Wisdom from Knowledge", groups or individuals can benefit by using this world's first method that can combine knowledge in a reasonable and sequential manner.

(For the English catalog, please look at <http://dten-wisdom.jp/00001-R3E1.pdf> )

In April, 2011 (present), this is explained in the Wikipedia article outlining problem solving in the last paragraph concerning 'Method of preventing a hit-and-miss situation in problem solving'.

<http://ja.wikipedia.org/wiki/%E5%95%8F%E9%A1%8C%E8%A7%A3%E6%B1%BA>

If we reflect on this, it can be seen that we have used this method unconsciously but since it was never fully explained or utilized, my book has become the world's first methodology based on this. (From <http://dten-wisdom.jp/00001-web.pdf> ,etc.)

**Explanation 7-2 (Esaki):**

If we make figure ① the starting point, then the information for realization as in figure ② 'result of the purpose of the upper level target (at the level of the Main Keyword) which is realizable and has the ideal state' is called wisdom.

That is, if the information tying figure ① and ② of diagram 3 is created from knowledge, it becomes wisdom information.

Although this can be done within the knowledge range of an individual, the collective knowledge of a large number of people would yield an increased chance of 'Thought action from mutual stimulation' and 'Awareness'. Therefore, a greater pool of wisdom, a wider range of choices and a more favorable result of the upper level target can be attained.

#### **Question 7-2 (reader)**

What should I do in order to create such wisdom?

#### **Answer 7-2 (Esaki)**

The area enclosed by the broken line in diagram 1 'Fundamental diagram of the purpose means relationship taken from the **Method of Creating Wisdom from Knowledge (DTCN Methodology)**' is the basic description of the method. (A supplementary methodology is omitted from this diagram.)

Three fundamental methodologies are found in the diagram. They are ④ 'Organization of the task in the Direction of Will', ⑧ 'Steplists that create procedure' and ⑨ 'FBS technique for optimizing the ideal state'. Section ⑦ is the method for managing the consensus building of the procedure and framework for the wisdom of the 'Implementation Plan' and its embodiment by groups in an organization.

#### **Question 8 (reader):**

Fundamentally, what are the wisdom's 'Process and Component' like?

#### **Answer 8 (Esaki):**

First of all, when there is a problem, the problem and task ordering must be switched as indicated in ③. If the task is given from the start, then just begin from the task.

This is to prevent a hit-and-miss situation as problem solving may give rise to further problems. From the perspective of the upper level target, 'To do what?' and 'What should be done?', if measures are taken to realize the task, this will prevent the hit-and-miss situation from occurring in conventional problem solving.

Sometimes a phenomenon may occur where the problem may disappear completely when thoroughly processing it. But for this to occur, the problem and task need to be switched. When viewing from the task, the problem becomes one of the conditions for solving it. It is then possible to compare it to other conditions and a selection can be made which can prevent the hit-and-miss situation.

#### **Comment 8 (reader): Indeed,**

#### **Explanation 9 (Esaki):**

Once the task has been confirmed, one will ask the following 2 questions "In brief, 'to do what?'" and "In brief, 'What needs to be done?'".

Then, one will write out as many plan of action as possible using the format 'How to do it' (verb and object) which answers those 2 questions. Next, with the expression "In order to 'How to do it' (verb and object)" and 'How to do it' (verb and object), pair all the written action plans with each other so that the purpose and means relationship will be formed.

By doing so, the **PMD method** ④ (Purpose Measure Diagram) can organize the resultant rough procedure together with the upper level target. A diagram that can be adjusted and visually indicate the 'Direction of Will' will be made.

Around the middle level (it can be higher up), the Main Keyword can be found that connects "In brief, 'what is one trying to do?'" and "What needs to be done?".

This will be the 'Word' that will help grasp the ideal state.

This is the same principle that summarizes the instruction into a word and makes the activity easier to do.

At the same time, in order to realize the solution the **Entrance Keyword** found at the bottom expression of the PMD will indicate where to start.

Simply put, this PMD (Purpose Measure Diagram) functions in the '**Direction of Will**' and when the Keyword is grasped, together with the Will vector the '**Summarized Will**' will be indicated.

As indicated in ⑤, the principle of 'Information of Difference by evaluation, selection and judgment' becomes a useable, visual evaluation and judgment criteria.

In addition, central to this '**Summarized Will**' regarding the 'things and systems' and concrete proposals that should be realized, **3 extreme proposals** are usually created at each level and the most suitable proposal will be found within the triangular range of possibilities.

This will then be evaluated, studied and selection judged. Then, the principle of the 'Mechanism of evaluation, selection and judgment by Information of Difference' will become useable.

The **FBS (Function Breakdown Structure) technique** ⑨ will be used for that.

The **FBS technique** is a thinking method for creating the mechanism, component and refining its scope of the **feasibly ideal** state, while conducting a comparative evaluation and selection of what needs to be included.

An analogy of making an 'Ergonomic desk for study' has been used to illustrate the workings of these methods.

After those concerned in the organization or group decide on something inductively (through various thoughts), its refining process is uniformly embodied through deductive thought processes by using the "**Phased steplist method with inductive and deductive organization and "3-5 improvement method"**" in book..

These 2 approaches are alternately and effectively made to create, evaluate, select and embody the proposal for the most suitable state.

The **RO (Root Organizing: groundwork) Method** indicated in ⑥ configures the organizational structure of this proposal. This is not used for individuals but rather as an organizational structure for large groups and organizations. The above is the framework of the main Method of Creating Wisdom from Knowledge excluding the explanation of the supplemental methodology.

Diagram 4 describes that once the components "knowledge, **Will wisdom**, and relationship table of new knowledge from the result of wisdom" can be explained to others, they become a part of conventional knowledge.

The above is an outline explaining the "**Method of Creating Wisdom from Knowledge**". This method is something that has been done unconsciously in our daily lives, but it can now be understood visually. Also, the proposals can be adjusted to suit the needs of the parties concerned within the physically feasible range.

Furthermore, in regard to the "**Analysis Method**" found in the diagram of "**Method of acquiring knowledge**", a supplemental article "What needs to be done in order to have said an analysis was carried out" was written and it can be found at the following URL.

<http://dtn-wisdom.jp/00001-E-analysis.pdf>

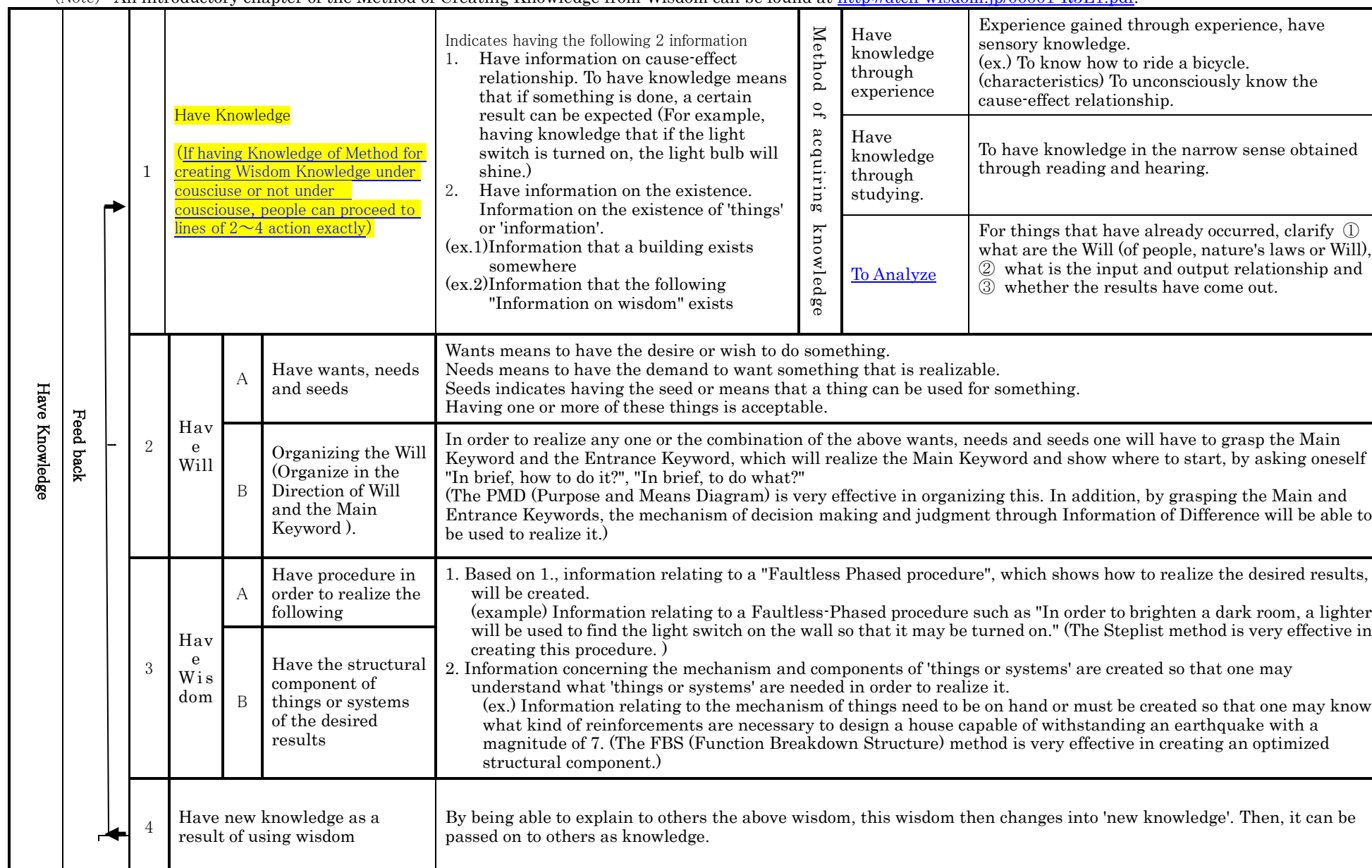
As reference, case examples that utilized the "System that creates wisdom" can be found at <http://dtn-wisdom.jp/E-nannni%20tukaeruka.html> .

#### **Comment 9 (reader)**

I would like to further understand the relationships in detail while reading that book.

**Diagram 5** Relationship of knowledge, Will wisdom and "New knowledge by result of wisdom" © Michihiko Esaki 2000/9/17, Rev4 2011-3-17

(Note) An introductory chapter of the Method of Creating Knowledge from Wisdom can be found at <http://dten-wisdom.jp/00001-R3E1.pdf>.



By returning the result which has the new information of 4. back to 'Have knowledge' of 1., it can be used to create new wisdom by the newly created 'Wisdom Engine'.

**DTCN Series 1**

**Method for Creating Wisdom from Knowledge  
-For Task Realization-**

**-DTCN(Design to Customers' Needs) Methodology-**

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## **Foreword of Chris Nishihama(Translator)**

I believe that this book is the world's first true "Method for Creating Wisdom from Knowledge". And at the same time, it mutually supplements the thinking processes (mindset and procedure) of the European and Japanese cultures. It also offers a novel thinking method and process tools for eliciting what was unconsciously carried out in daily life, making the contents mutually and effectively usable.

I was born and raised in Canada with ancestral ties to Wakayama, Japan. As a child, my parents had constantly passed down the values of the Japanese which often conflicted with the western culture. Thus, much of my life until adulthood was a struggle in keeping both cultures in harmony. After coming to live in Japan, I again was confronted with bridging a cultural difference since modern Japan was somewhat different from what was passed down. With a university background in physiology and in-depth studies in machinery, carpentry, electronics, displays, computer technology since coming to live in Japan, I thought I was ready for this translation project. However, to my surprise there was nothing to base Dr. Esaki's methodology on and the translation proved to be difficult indeed. With much discussion with the author, the final wording of this book was decided that a direct translation approach was necessary for this first book in order to create a mindset that was in line with what the author wanted to convey.

I worked as an in-house translator and interpreter for Sony, Sharp and Philips during their project to develop large displays that now are commonly found in homes. During this period I realized that the mindset of the Japanese differed somewhat depending on which part of Japan you were from. Much that is said is left for interpretation by the listener and sometimes one may miss the point that the speaker is trying to state. Thus, I found it was necessary to quickly absorb the philosophy of the people from where each company was from. This was especially the case with Philips being the most different of the three companies. In the case of the Japanese, knowing the Japanese proverbs was very useful as much of what is done is based on old sayings and proved methods.

Dr. Esaki's methodology was created based on a need, but I believe it was possible only because he was of Japanese descent with an understanding of English. His methodology forces one to view their expressions from a vertical and horizontal stance and arrange them in such a way that everything falls into place forming a logical mindset, showing one the most efficient way to proceed. The Japanese language has been written vertically for centuries, however, modern Japanese is written both horizontally as is English and vertically. Changing the direction of how their language is viewed and

understood is second nature to the Japanese. However, what is lacking in the Japanese language is the clearness of who or what the subject is and to whom or what the receiver of the action is. This is where the English language is very clear. Thus, with the strengths of both languages the basis of this methodology came into existence.

Although I had hands-on experience with this methodology, I'm sure that with some practice and review (as well as first reading Column 4 for an easier overall understanding) you as a reader will grasp and change your approach to problem solving and your mindset on how to proceed in anything that you may do, as I do now.

## **Foreword of the author**

This book is derived from the original methodology "A Method for Changing Knowledge to Wisdom" found in the "Advanced Project Management Methodology" book, published by ASI Press (American Supplier Institute). Although the quoted examples are related to aircraft (since through the manufacturing and development of aircrafts I invented this methodology), the underlying principles are universal and so the methodology also holds true for all planning and management fields as well as realizing tasks.

This methodology has its roots to when I said to myself, "I want to make airplanes when I grow up." This was a dream that naturally came to mind as a child when I was flying propeller-like toys into the evening sky. At that time, Japan had a gloomy atmosphere as it was in the midst of war.

Driven by my desire, I would then spend a great portion of my life in aircraft manufacturing, designing, planning, etc. After I majored in naval architecture engineering at Osaka University, since it was the next closest thing to aircraft designing, I found employment at Kawasaki Aircraft (presently Kawasaki Heavy Industries) to pursue my dreams. Eager to experience various departments in aircraft manufacturing, my requests were accepted by the company and I began work in assembly and repairs.

Thereafter, over 36 years and 32 different offices in various departments, I developed the medium-sized training aircraft for the Defence Agency, which was a long-term project for the company, I was responsible for creating a market for the emergency lifesaving medical helicopters, etc. Excluding a short period, I would then spend exhaustive years in the development of aircraft related areas. Moreover, I was engaged in some new megaprojects.

My daily hectic responsibility was the gathering of 5,000 procurement parts and 2,000 in-house fabrication parts which had more than 20 different processes for the aircraft assembly line and the timely completion of the aircraft. I kept wondering if there were any clear methods of expediting the work from the initial project phase of manufacturing to its completion. On one side, there were no methods or procedures for achieving the social needs and cost goals. Thus, I began to extensively read various documents and look for new findings. However, the method for which I hoped to solve such integrated problems was not found (Of course, techniques that were made by predecessors in these fields such as value engineering, value analysis, etc., were of some help.).

Then in 1974, I presented my Steplist for Reasonable Purchase Price at the U.S. Value Engineering Convention and as a result I decided to create a new methodology/procedure that would surpass anything that was in existence by referring to the Design to Cost concept that was being advanced in the

U.S. Department of Defence from the 1960s.

Thereafter, in the 1970s a joint development of the BK-117 helicopter between Kawasaki Heavy Industries and West Germany incorporated my newly developed DTC/Steplist. (As of 2007, the U.S. Army had adopted 342 units of this fuselage with some minor improvements as the UH-72A utility helicopter by way of the Eurocopter Group.)

With such success, I presented my methodology in 1979 at the U.S. Value Engineering Convention in Washington D.C.. This became an opportunity to have my methodology to be officially applied in the development of the XT-4, the new medium class training aircraft for JASDF(Japan Air Self Defence Force) in 1980. Thus, it was then that I was convinced that this methodology which tries to solve all the problem points/needs that are seen on-site in an integrated manner, was far more advanced than anything that was in existence at the time as seen from my personal experience in the field (from manufacturing to planning).

Through these experiences, the new Design to Cost (DTC), the Steplist, 3-5 Phase Improvement, and the FBS (Function Breakdown Structure) methodologies were completed. The methodologies were then generically named, Design to Customer Needs (DTCN).

From these initial validation results, I received a request from the National Space Development Agency (NASDA) of Japan to publish the 'New Thinking and Its Procedure for Design to Cost' from the Sanno Institute of Management (December, 1984). This book embodied the Design to Cost (Purpose Value Cost Design) which was conventionally in the field of principles (concepts) using a procedural format and in 1985, it was appraised as the best book published by the Japan Management Consultants' Association.

In my efforts to have my methodology's effectiveness validated, the Design to Cost was officially adopted not only in Kawasaki Heavy Industries but also in the development of a medium-sized training aircraft for the Defence Agency and in the various projects of the National Space Development Agency (NASDA) of Japan. Also, the Design to Customer's Needs Methodology, an evolved Design to Cost, became viewed as a methodology/procedure which solves the difficult Information Systems development procedures. I have been told that the Defence Agency had introduced a study using this methodology for the New Method for System Design. Furthermore, the National Space Development Agency had applied this methodology in the development of the H- II Rocket bringing the developmental cost of 25 billion yen down to 9.7 billion yen. The results of the adaptation of this methodology are indicated on the table of the next page.

\* \* \*

Of course, no matter how superior a methodology may be, an exactly equal result is not always attained. There were times when there were differences in the results when I utilized this methodology on-site. However, the problem of this difference was not in the methodology, but among the operators.

Conventionally, when a large number of people are involved in a new project, there are variations in the mindset, sense of values, speculation or the desire (motivation) when taking into consideration the client's intentions and usage of the finished product, and so a vector orientation towards a visible direction is needed but so often not conducted.

There was a problem of controlling the results of the project by deciding on the same targets, sharing the same direction of value (direction of intent) and having the project's constituent members to acknowledge each other. Although an organization may appear to be a group of individuals having the same target, if its means are not agreed upon between the members the desired results, not to mention the advancement of the project itself will become difficult to attain.

Thus, I racked my brains day and night to figure out a way of creating a visible common method and training technique that would allow the sense of values (direction of intent or direction of value) between the workers to head towards the desired target. Then, after much trial and error, the Purpose Measure Diagram (PMD), which is a method that visibly indicates the direction of value (direction of intent), was born.

This method organizes the common objectives, purpose and means which must be held between those participating in the project, and facilitates the mutual agreement among the parties. However, the effect of the PMD in its implementation far surpassed my intended results. The results are stated clearly in IV of Chapter 3; it does not simply find the means for realizing the task, but also provides a clue to solving the problems of the "Purpose and Means" related to the job positions of people.

For almost a half a century I have poured my heart and soul into the Advanced Project Management Methodology and now I have reached my mid-70s. This book is a compilation of methods (the PMD, Steplis and FBS Technique) that yield effective results. I wrote this book to leave behind a way of realizing difficult tasks and I encourage those of you who are confronted day and night with such challenges to utilize them and to see for yourselves how much easier the tasks can become.

Lastly, as this book is being published under the Japan Materials Management Association, I can't help but to feel a strong leading for the future of this book. The reason for this is because most of Japan's companies operate using a basic agreement for trade document for purchasing materials which was a

format offered by this society. Because of this format, the Steplist is a central pillar of this book as well as being a starting point for my methodology. (Refer to page102-103)

'The Steplist for Reasonable Purchase Price' (discussed in case 3 of the 1972 Steplist) was born.

\*The DTCN abbreviation stands for Design To Customers' Needs (customer needs design), and DTC stands for Design To Cost (target cost design).

September 17 2008



**Photograph taken in Washington, D.C. in May, 1979 when Mr. Michihiko Esaki presented the "New thinking and its procedure for Design to Cost" . The following year, Mr. Iwabuchi, a technical official of the Defence Agency came across this methodology in the data files of the Information Center of Science and Technology and evaluated this thesis as being unlike any other in regard to specific processes. Therefore, this became the main reason why the development of the medium-sized training aircraft was contracted to Kawasaki Heavy Industries.**

### Adaption case of each method of DTCN/DTC

	Period	Related organization	Project	Method	Contents
1	1965 to 1970	Kawasaki Aircrafts	Assembly coordinator Parts coordinator	Implementation of the Steplist's basic principles.	First time since the foundation of the Kawasaki Aircrafts that a 'No-shortage' assembly line was established.
2	1971	Kawasaki Heavy Industries, Ltd.	Investigation and counter-measures into the cause of the high-priced domestic helicopters, the H-500 and OH-6 .	Estimate the actual manpower after viewing the price component table, the routing form and the site.	It was discovered that the cost of domestic production of equipment were set according to the high cost of imported parts by trading companies, and it was dealt with accordingly.
3	1972	Kawasaki Heavy Industries, Ltd.	Principles operating when international competitiveness was achieved with the sudden fall in cost.	Steplist for Reasonable Purchase Price	Consistency of the above-mentioned countermeasure Principles in the explanation when the estimation costs presented by a supplier was reviewed and the price rapidly fell.
4	1978 to 1979	Kawasaki Heavy Industries, Ltd./MBB	Development of BK-117 helicopter	The DTC/Steplist procedure and the FBS technique are designed and applied for the first time.	First application in a civilian plane. Success in costs excluding the engine. In regard to the engine cost, since there was a private deal between the U.S. manufacturer and the trading company, price reductions failed, but were successful thereafter.
5	1979	The U.S. Value Engineering Association	Presentation of the DTC Steplist in Washington D.C.	Mindset of design to cost and its procedure	Person in charge from the Defense Agency (Technical official: Yukio Iwabuchi) discovers the following on the left by document retrieval. An opportunity for the official application in the medium-sized training aircraft was created.
6	1981 to 1988	Defense Agency, Kawasaki Heavy Industries, Ltd., Mitsubishi Heavy Industries, Fuji Heavy Industries Ltd., and equipment from each company.	Development of the Defence Agency's new XT-4 training airplane.	PMD, DTC and RO method (Root Organizing method), etc., of the mass production unit price.	Development cost, mass production cost, performance, schedule, and reliability together with Purpose Value achievement.

	Period	Related organization	Project	Method	Contents
7	1984 to 1986	National Space Development Agency of Japan and each related company (from heavy industries to electronics)	Development of the H-2 rocket and space satellites	PMD, DTC and RO method (Root Organizing method), etc., of the mass production unit price.	Development cost, mass production cost, performance, schedule, and reliability together with Purpose Value achievement.
8	1984	Ministry of Home Affairs, emergency institutions, anesthesiology association, and resuscitation institutions.	Kawasaki Heavy Industries, Ltd. and Medical Nagoya Emergency lifesaving system by helicopter	Mindset, PMD, and Steplis of "to do what and how to do it".	<ol style="list-style-type: none"> <li>1. Making of the PMD to explain the setting up of the new system</li> <li>2. Establishing the target time of beginning the initial treatment.</li> <li>3. Indirectly, the beginning of an emergency life saving technician.</li> </ol>
9	1986	Kawasaki Heavy Industry's freezer van	Cost reduction of a small freezer vehicle.	DTCN, Steplis, and price component table	The mass production unit price of 1 million 29 thousand yen was reduced to 489,000 yen.
10	1987 to 1989	National Space Development Agency of Japan	Information system room (non-regular employees) Escaped the initial chaotic situation of developing an integrated software.	PMD, DTCN Steplis, and 3-5 Phase Improvement Method.	<ol style="list-style-type: none"> <li>1. The method of escaping the initial confusion when designing an integrated/next-generation software, and its maintenance.</li> <li>2. Support in making a long-term Creation Document based on the above-mentioned.</li> </ol>
11	1989	Kawasaki Heavy Industries, Ltd.	Develop of the JEM hatch	DTC of development cost	Adaptation of the DTC Cost to the spacecraft in regard to the development cost.
12	1991	Defense School of Medicine	Installation of a disaster prevention medical research laboratory	Setting up an explanation for the Defense Agency Act and Self-Defense Forces Law. Creation support.	Thereafter, the laboratory is formally approved (However, only the budget from the radiology laboratory was curtailed.).
13	1992	Japan Management Association Consulting Ltd. (advisor)	Developmental support for the consulting system	PMD/DTCN	<ol style="list-style-type: none"> <li>1. Creation support of actual activities methods in "cost-half-solution" (Kazumi Eguchi).</li> <li>2. Creation support for the production process (Tetsuji Hiroshige) using a technological task structuring approach</li> </ol>



	Period	Related organization	Project	Method	Contents
14	1993	Lecturer for the Management & Coordination Agency's Administrative Management Bureau's Information System Planning Section	PMD	DTCN	In the Management & Coordination Agency sponsored information system training, explanations were given how to build consensus using the PMD when constructing the information system.
15	1999	Asahi University Graduate School, Information Management Research Department, Project Management Studies, and professor	Wisdom engine, a method for Changing Knowledge to Wisdom (=Method for Creating Wisdom from Knowledge)	PMD/DTCN/DTC	Graduate student and Inami Kiakira and joint development (sponsored research from Gifu Prefecture soft peer)
16	2004	Asahi University Graduate School, Information Management Research Department, Project Management Studies, and ofessor	Accounting that create wisdom and can be understood by administrative accounting and engineers	DTCN/DTC, PMD, a method of accounting at creates wisdom and can be understood by administrative accounting and engineers	Joint development with Ken Kawai (information management studies Doctorate)
17	2006 to present	Manned space system project supervisor	Method of completely uniting the project management method and system engineering PMD DTCN/DTC	Method of administrative accounting that creates wisdom	Work between clerks and engineers were synchronized, and PM and SE were integrated.

**Recommendation for this book "Method for Creating Wisdom from Knowledge" for Task realization**

Jun Tsuruta

Fifty years ago, I had the opportunity to work with Dr. Esaki at Kawasaki Aircraft (now known as Kawasaki Heavy Industry), at the Gifu plant, in Japan. Dr. Esaki was 3 years senior to me, and he taught me certain business principles, especially the use of the Steplist thinking in this book and development of logical solutions to business problems. He taught me an organized way to think, and his influence on me would last a lifetime. I have carried many of his ideas with me throughout my career.

In the 1950s, Japanese business culture was totally focused on following rules, and allowing no deviations. There were no incentives for creativity in Japanese companies then, and all of us were trained to be "yes men". I was not happy with the nonproductive rules and the strict age seniority system. Because of my frustration with overall business practices in Japan, I left in the mid 1960s and came to the United States.

I've worked for three major U.S. companies in the past 40 years. Unlike Japanese companies, each leader of the company must be able to make decisions on their own. I was allowed to exercise authority over company funds of over \$500 million at a time, and the company trusted my integrity, intelligence, and judgment. The approach or basis for my decisions was the same as Dr. Esaki's Steplist thinking (The general basic concept of the Steplist in this book was created originally from the Steplist for Reasonable Purchase Price in this book) and "One must go around the worksite and ask, "Is there anything that you are concerned about?" " as stated in Column 3 in this book. With every decision or business process, I was constantly reminded to think of all associated issues, and to develop a flow chart on paper or in my mind, similar to the Steplist thinking process flow.

During my first senior executive time at Piedmont airline, I would always carry pencil and paper and draw the comparisons flow charts for optimization in office or while flying over the country, to constantly evaluate ongoing business or important decisions. I drew existing mechanisms of business, and data collecting done by each department, and analyzed how to develop a more efficient operation by dropping off unnecessary mechanisms or data collection, and establishing real time information systems. We did not have personal computers or any convenience gadgets you see today.

All of us alive face challenges, in our personal lives and our business lives, and we must make decisions, and we must avoid risks; but without risks, you are not able to become a successful business man. Creating comparable ideas, making comparisons and then evaluating them may take a couple of hours, but we must figure out affordable risks or non affordable risks in a precise manner. We must figure out what elements are involved in the process, and what is the maximum return from these risks which are the basic process of decision making.

As one example, I recall being in a meeting of executives in the late 1990s when our company was announcing to the executives that we would be buying 'hush kits' to meet upcoming noise regulations, like all of the other legacy airlines. In my mind, I began considering all of the elements of the effectiveness of such an old aircraft with a hush kit. Immediately I imagined a list of all of the positive sides and negative sides.

Obviously, it would affect fuel, because of the age of the aircraft. Running down the list, I saw the whole consequences of new aircraft vs old – aircraft downtime, reliability, crew costs, training costs, heavy maintenance costs, and more. I spoke out in opposition, and after deeper consideration, the company decided to buy new aircrafts. This strategic move is one of the major reasons why the company avoided bankruptcy and is one of the most healthy airlines in the world today. This mind comes from same concept of DTCN/LCC trade work sheet in chapter 6.

**Mr. Jun Tsuruta's brief history:**

In 1966, Kuniaki Tsuruta left Japan for the United States to challenge himself, his beliefs, ideas, and business skills. Only 10 years prior to his arrival in the US, persons of Japanese ancestry were unable to own property in the US. The first Japanese American congressman was elected only 5 years prior to his arrival to North Carolina.

In 1966, he was initially employed by Piedmont at a salary of only \$1,000 per month. He rejoined Piedmont Airlines in the early 1970s and was promoted to Vice President in less than 10 years. Piedmont Airlines had over 24,000 employees and subsequently merged with USAir. After the Piedmont merger in 1989, he was recruited by Midway Airline in Chicago as a Senior Vice President. In 1994, he was recruited by Continental Airlines as a Senior Vice President of Purchasing, as a right hand to the Chairman.

He has been credited as being one of a very few senior executives who turned around Continental Airlines, both financially and operationally from the worst to the best, in the year after their arrival in 1994.

He is well known as a decisive person and knowledgeable in both aircraft manufacturing and airlines. As an example, he dramatically and decisively transformed Continental's maintenance approach, outsourcing to mainly OEMs, while simultaneously freeing up over \$400 M in capital at a time when the airline was otherwise on the verge of bankruptcy. His emphasis on reliability and total cost was a centerpiece of the positive changes that occurred at Continental during this period, and was a dramatic contrast to the narrow focus on invoice price common in most airline purchasing departments at the time. He remarks that a successful business man must find the problems, then find the solutions, articulate the issues, and implement the corrective actions.

Since his retirement from Continental, he is working as advisor to various companies, particularly in aerospace, and on projects including the Boeing 787 Program. He also established his own real estate development and owns over 100,000 square feet of a high end shopping center, as well as conducting a warehouse business. He has received various awards, from lifetime achievement to the chamber of commerce from various cities in the United States.

# Method for Creating Wisdom from Knowledge for Task realization

Originated from Dr. Michihiko Esaki

Organized by Masatoshi Kasuya

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## **Part 1**

### **Wisdom of Task Realization**

## **Chapter 1 Problem and Task**

### **1. "Problem" Solving through "Task" Realization**

#### **"Problems are for solving" and "Tasks are for realizing"**

Although a few years ago it was stated in QC (Quality Control) books that "the obscurity of problem and task was an issue", these two words have a closely related meaning and generally have been used ambiguously without differentiating them. That is, confusion occurred because sometimes instead of saying, "There is a problem", we say, "There is a task" or instead of "Solve a problem", we say, "Solve a task". The relationship between the problem and task was not clarified.

Then, what is the difference between problem and task and what kind of interrelationships are there? In order to clarify this ambiguous relationship between problem and task, first, the two words must be arranged into a purpose and means relationship and define their significance and contents. By doing so, the positioning of these two confused words can be clarified. Thus, it can be concluded that "problems are for solving" and "Tasks are for realization". Why I can clearly assert this is because with the PMD (Purpose Measure Diagram) described in detail in Chapter 3, this question can be solved. Let us use the PMD and see the relationship of the problem and task.

#### **Using the PMD, check the relationship of task and problem**

As can be understood from the above diagram, by attaching the same verb "solve" to "problem" and "task", the relationship (Purpose Measure Diagram) of the two words are seen with A and B.

To confirm which is the purpose and which is the means,

- (1) Repetitively, compare and read A and B from the top to bottom "In order to do A, do B." and see which sounds natural. And then, check the relationship. Next,
- (2) From the bottom to the top direction, repetitively say to yourself, "First do B, then A" and see if a connection can be made and if a relationship can be confirmed. The result is, A is more naturally related to purpose and means. In addition, by bringing the relationship a little closer to a purpose and means arrangement, C is formed.

And, when trying to add the expression "Clarify the task" while looking at C, D is formed and the task and problem relationship becomes clear. If such a relationship becomes clear, the



following can be said.

- (1) After the task is made clear, the problem of realizing it comes about.

In other words, if there is no task to realize to begin with, then no problem arises.

- (2) If it is known among the parties concerned what is going to be done and if the task is implicitly understood by all, then it is possible to directly enter the problem solving. However, this is a social science, especially in the world of management, and so it does not apply to the study of clarifying mechanisms in nature. For instance, if we look at "solve a problem" in mathematics, we can see that there is a common recognition of the task because the relationship of laws of nature which already exist may be expressed using a mathematical formula. Thus, by immediately entering "solve a problem" no issues arise.
- (3) However, in either case, if the parties concerned have not organized the relationship of purpose and means according to the task, there will be a difference in how the problem is grasped and its contents. And so, this is why sometimes effort is made to solve a meaningless problem.

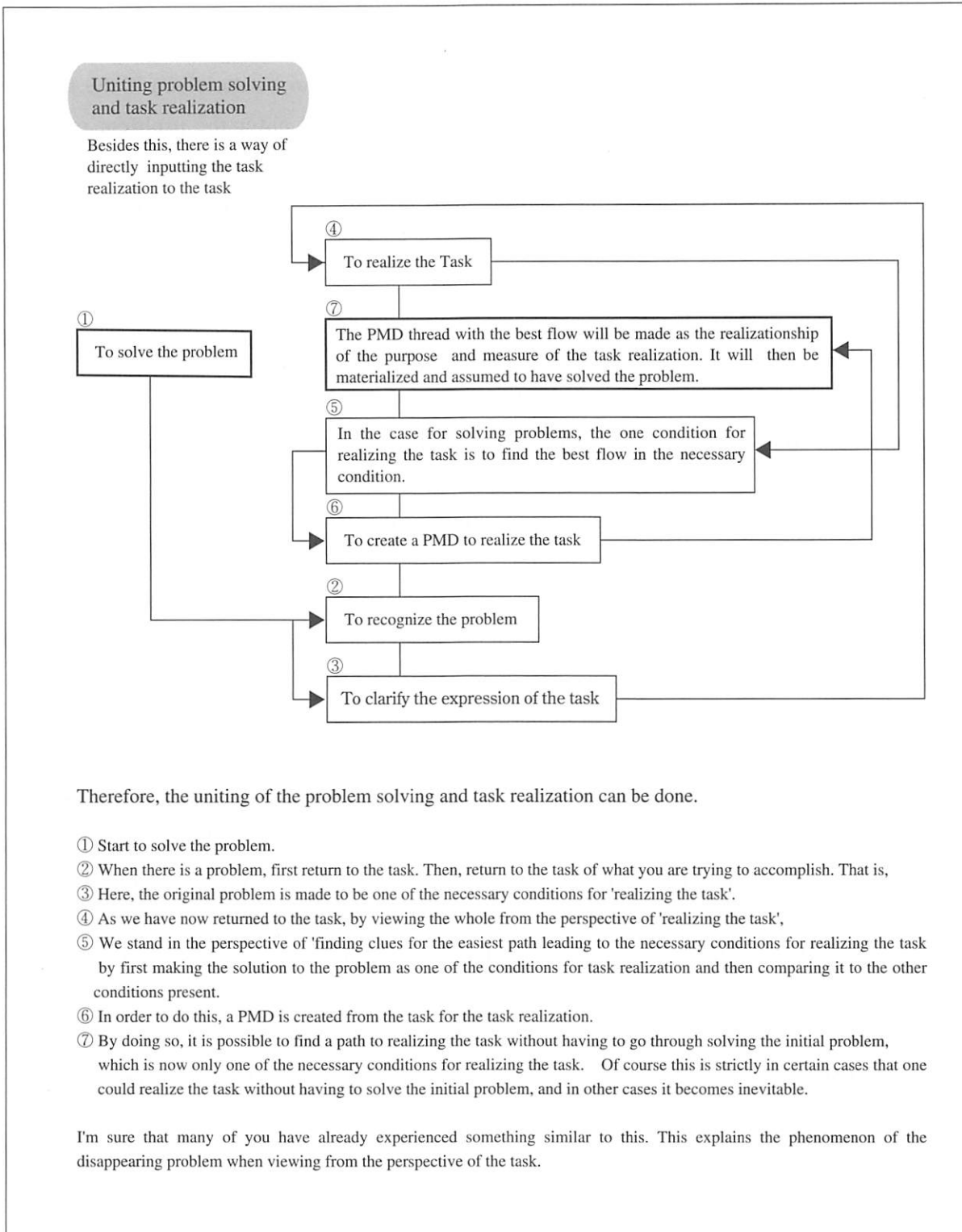
**This is solved by "problem solving" through "task realization".**

Conventionally, the scientific method is used to solve problems. This is where the problem is analyzed in detail and the cause is removed to create a solution. In other words, the act of finding the cause to the problem will be like trying to hit the mole in the Whac-a-Mole game. I will not go as far as to say that I completely deny this kind of method. However, even if the problem is removed, others will continually rise in its place. Moreover, if people are involved, the cause will point to the inadequacies of certain individuals, causing them to be hurt.

In a management organization where problem solving is done using only analytical methods which are for studying natural mechanisms, in most cases the organization will fall into the Whac-a-Mole situation when problems arise, and problems are not solved. Then how can one escape such a trap when trying to solve problems? I think you have already guessed that the answer lies in the diagram showing the problem and task relationship. That is, one only needs to understand that problem solving is only one of the necessary conditions for realizing the task.

Incidentally, when problem solving becomes one of the conditions for realizing the task, what happens? Diagram 1-1 indicates that relationship. As can be seen from the diagram, problem solving is integrated into the task realization and so the solution will be found if the task is realized. Moreover, by changing the line of questioning when a problem arises, a negative type of problem can be converted into a positive one. I will expand on this on the next page.

**Fig.1-1 “Problem solving” can be solved through Task realization**



## **2. Questions oriented for "Problem solving" and questions for "Task realization"**

### **Questions directed to the past and questions directed to the future**

About 30 years ago when the department stores were thriving in Japan, the board of directors of Mitsukoshi Department Store passed a motion to dismiss Mr. Okada, the president at that time.

In a plot within the company to overthrow the president, it was grandly reported by the media that president Okada had opposed the motion and the scene where he kept shouting, "Why?" left a lasting impression. As can be understood from this, the question "Why?" is mostly used negatively. That is, it is usually used to question someone as to what bad thing was committed and it mostly points to the past. Then, what kind of questioning is there in order to point to the future? The answer is, "In order to do what, how to go about doing it?".

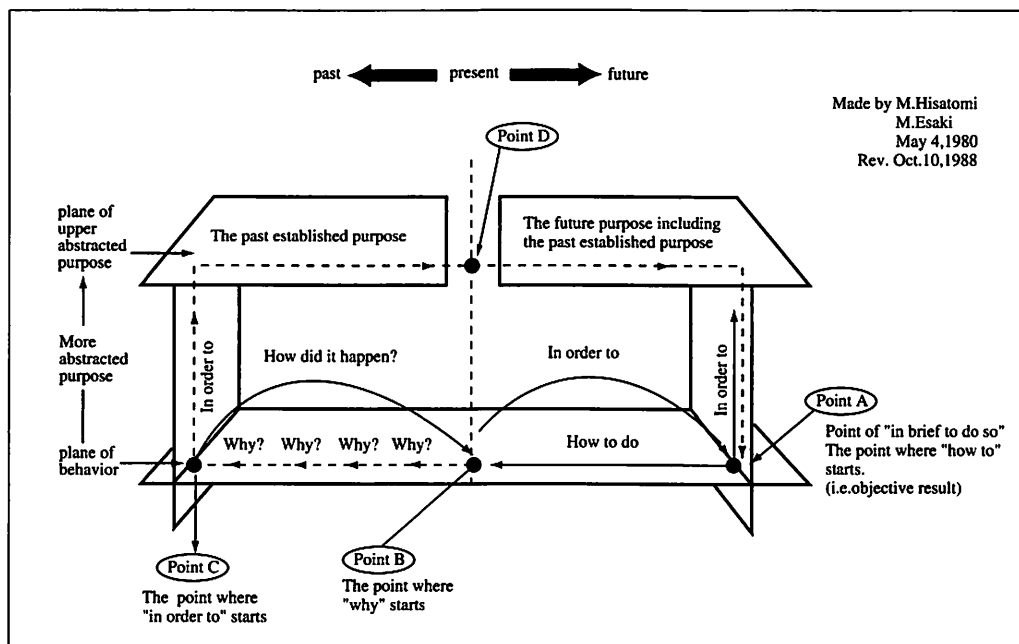
As can be understood from Diagram 1-2, the question, "Why?" deals with past events and "In order to do what, how to go about doing it?" is directed to the future. Therefore, if we allow both questions to coexist, as indicated in Diagram 1-2, the direction of the questioning becomes reversed and one of them must be denied. This would also make attaining a suitable answer difficult. The correct line of questioning is necessary and indispensable for "problem solving", but even more so for "task realization".

Here, let us organize the method of asking the correct question. "Why" Question: about the past, or goes back to a certain known knowledge. Therefore, if the question "Why" is used when thinking of something unprecedented, the thought processes come to a stop. "In order to do what, how to go about doing it?" Question: directed to the future and creates wisdom with respect to the future. Similar to this, there is the question, "in order to do what, how to go about doing it?". What one needs to be careful here is that the question, "For what purpose?" sometimes causes one to deal with problems quickly and carelessly. An example of this may be during pre-war times people may answer, "for the country" or "for the king".

## How should questions be stated to draw correct knowledge and wisdom?

I believe it is clear now that to draw out the required knowledge, the line of questioning must be suitable. Then, as to how the question should be asked, if stated more specifically, it will be as follows. To grasp the correct knowledge of the past: The only way is to grasp the correct cause-effect relationship or the knowledge of the mechanism and component of things. The line of questioning will be: "How did that come about?" or "How is it that that is happening?" Let us think why it is not possible to draw correct knowledge by asking, "Why?" If I get right to the answer, it is because the person answering the question will discontinue the reasoning when it is convenient for them.

**Fig.1-2 Exact usage of the questions "In order to do what, how to do it" and "why"**



### (note)

While the "In order to do what, how to go about doing it?" question makes the focal point of the question directly toward the future from the present point B, the "Why?" question makes the focal point of the question face the past towards point C directly from point B, making it abstract, forces one to recognize it, becomes burdened by it, reflects upon it and passes it through to point D. In the end, it reaches point A, where one recalls what the purpose was, and from point A it moves toward point B while pondering how it should be handled and returns to point B.

For instance, assume a child asks, "Why is it possible for a goldfish to live under water?". Then, parents who do not know the answer may say, "Because God made them that way," and cut off the explanation. On the other hand, if we change the question to "How do goldfish live under water?" what will the outcome be? The parents must answer with a correct cause-effect relationship. That is, they will need to specifically answer, "Goldfish can live in water because there is air in the water and the fish use their gills to breathe that air". In order to draw out the correct cause-effect relationship, one must ask, "How to do it?" Then, it deals with things in the future. That is, in order to grasp the purpose and means relationship that has consistency, the question should be phrased: "In order to do what, how to do it?" From this, wisdom is created for the future, that is, the value direction is clarified and the purpose and means relationship can be grasped.

**The question, "Why?" arrives at a dead end.**

In your experience, have you ever shrunk back from being asked persistently, "Why did you do such a thing?", "Why?", "Why?" by seniors students, teachers or superiors? This kind of questioning allows one to take a dominant stance and corner the listener. It cannot be helped if others believe that the asker has some ulterior motives. If someone asks, "Why?" in regard to some unchangeable event and corners that individual, there is no way of evading that question. However, if a correct purpose and means relationship or knowledge of the cause-effect relationship can be grasped, an explanation starting with "Because..." can easily solve this issue.

**"Because" in regard to "Why?"**

On the other hand, in government organizations, there are times according to the fiscal law that one has to answer questions that begin with "Why?". As to the question "Why?" in such a case as this, because it was asked after the correct relationship of the contents was grasped, by answering with "Because" suitable measures and budget acquisition approvals can be attained. In the past, when I helped with the enactment and introduction of the emergency care system by helicopter and the paramedic system, I made the KEY WORD, "Save those that can be saved" and it became the starting point of this institutionalization.

### **3. "Method for Creating Wisdom from Knowledge" for Task realization**

#### **Task realization and data, information, knowledge, wisdom**

In our daily lives, we frequently use phrases such as "Deepen one's knowledge", "Polish one's wisdom" or "Collect data", "Collect information" and "Insufficient information". However, when we use such phrases, we do not consciously think of its significance or what kind of cause-effect relationship exists. Then, let us see the necessary data, information, significance and contents of the information and its relationship for realizing the task.

#### **(1) Have data :**

In regard to "Have data" this is information that has not been organized.  
For instance, questionnaires that have not been organized are data.

#### **(2) Have information:**

In regard to "Have information" it is data that has been organized, and in the narrow sense has information. For instance, data that has been made into a graph or a map, etc. Information in the broad sense includes the whole data, information, knowledge and wisdom, but information in the narrow sense is what is commonly termed 'information' in English speaking countries. However, it must be noted that in English speaking countries the expression, "Information in the broad sense" does not exist.

#### **(3) Have knowledge:**

In regard to "Have knowledge" is to have

A. Information in regard to the cause-effect relationship,

B. Information about what exists (including information on the mechanism and component of things).

For instance, to have knowledge of apples is to know the conditions and processes necessary for apples to form. Moreover, it is to know the nourishment component, taste, etc., of the apple.

#### **(4) Have the direction of Will or Value**

Incidentally, with just this kind of data, information and knowledge, they do not necessary head towards creating something with value. In order to create something with value, only with the following motivation factors and intentions that wisdom arises and is created. In regard to "Have wisdom", it is

"When one wants to do something, information on how it should be done is created and made useable."

As to what are motivation factors and intentions, the following 3 points can be stated.

(4 - 1) Have wants: is to have a desire or wish "I want to ..."

(4 - 2) Have needs: "I want this" a specific wish that can be realized or have potential.

(4 - 3) Have seeds: By having seeds or fact that can be used for something, if the seeds can be seen then the purpose for its use and its role can be understood.

#### **(5) Have wisdom:**

When either oneself or the organization or group that one belongs to hopes to realize such wants, needs and seeds, the information on how to realize them is called the information of wisdom. When such information can be used for problem solving or task realization, it becomes one new knowledge and is accumulated in Knowledge (3). It can be said that the human race has unconsciously repeated such things in their minds.

#### **Wisdom Mechanism for Task Realization**

What kind of specific mechanism and contents does wisdom have? Wisdom is in brief, information regarding "In order to do what, how to do it?" when one wants to do something. The information is constructed based on the following (1), (2), (3),(4)

(1) Wisdom with a clear direction of intention (what one wants to do):

The value expressed by the Purpose and Means Direction of 'In order to do what, and how to go about doing it?' or the method that indicates (on paper) the form that can see the Direction of Intention.

→ This can be created by the PMD (Purpose Measure Diagram) method explained in Chapter 3.

(2) Wisdom that creates the process and procedure for realizing the task:

Wisdom that indicates the process and procedure for realizing the direction of value (or, direction of intention).

→ This can be made by the Steplis method or by the 3-5 Phase Improvement Method explained in detail in Chapter 4.

(3) Wisdom that searches for the mechanism and component of the objective, which is the task (2) realizes it based on the process and procedure, that is, a solution method based on time. In regard to this, it is necessary to find the spatial component of the results, which are the mechanism and components. This can be made by the FBS (Function Breakdown Structure) technique.

**(4) Wisdom of the Implementation Plan:**

It is the wisdom that states who with what kind of procedure and framework is going to realize the task. This Wisdom → Implementation Plan. This can be created by the Implementation Plan method.

What the arrow points to after each wisdom item is the method that demonstrates the wisdom.

Chapter 2 explains the outline of what kind of method it is and how it should be used. In chapter 2, I would like to combine and explain one by one the contents, methods, effectiveness and specific performance cases. By using such wisdom comprehensively, what was once a difficult task can now be realized, and at the same time the problem that is included within it can now be solved.



## **Chapter 2 Wisdom of Task Realization - 3 Basic Methods**

From Chapter 1, it was understood that problem solving can be achieved by realizing the task. I would like to outline the 3 methods for creating the necessary wisdom to realize the task (Although in Part II two more methods are added for a total of 5 methods, the 3 mentioned here are the fundamental methods.).

As already mentioned in the foreword, these methods were attained after much hardship in order to realize the task, and have already been proven to be effective. For those who have never dealt with these methods, it may take awhile before one understands them and their effectiveness.

In this chapter, I would like to outline these methods and explain how effective they are in realizing the task.

Depending on the task, it may demand a methodology, the completing of a product by a faultless process when the product is complicated, or a new method/product that must be discovered or invented, etc. However, if one is able to fully utilize the method below, the realization of any task that is physically within the bounds of being made possible can be achieved. The specific way to advance these methods and the details of related cases will be described in detail in Part II, and so for now please refer to the image diagram of each method and their outlines to understand them.

### **1. Method of discovering the appropriate purpose and means for task realization: Purpose Measure Diagram (PMD)**

This method examines and organizes the purpose and means for compatibility, and by doing so, it checks whether the theme has the potential for being realized and the initial prospects for realization is confirmed.

#### **Overview of PMD**

When we set out to do something, without fail we have either a theme or a task. In regard to the theme or task, the PMD does the following.

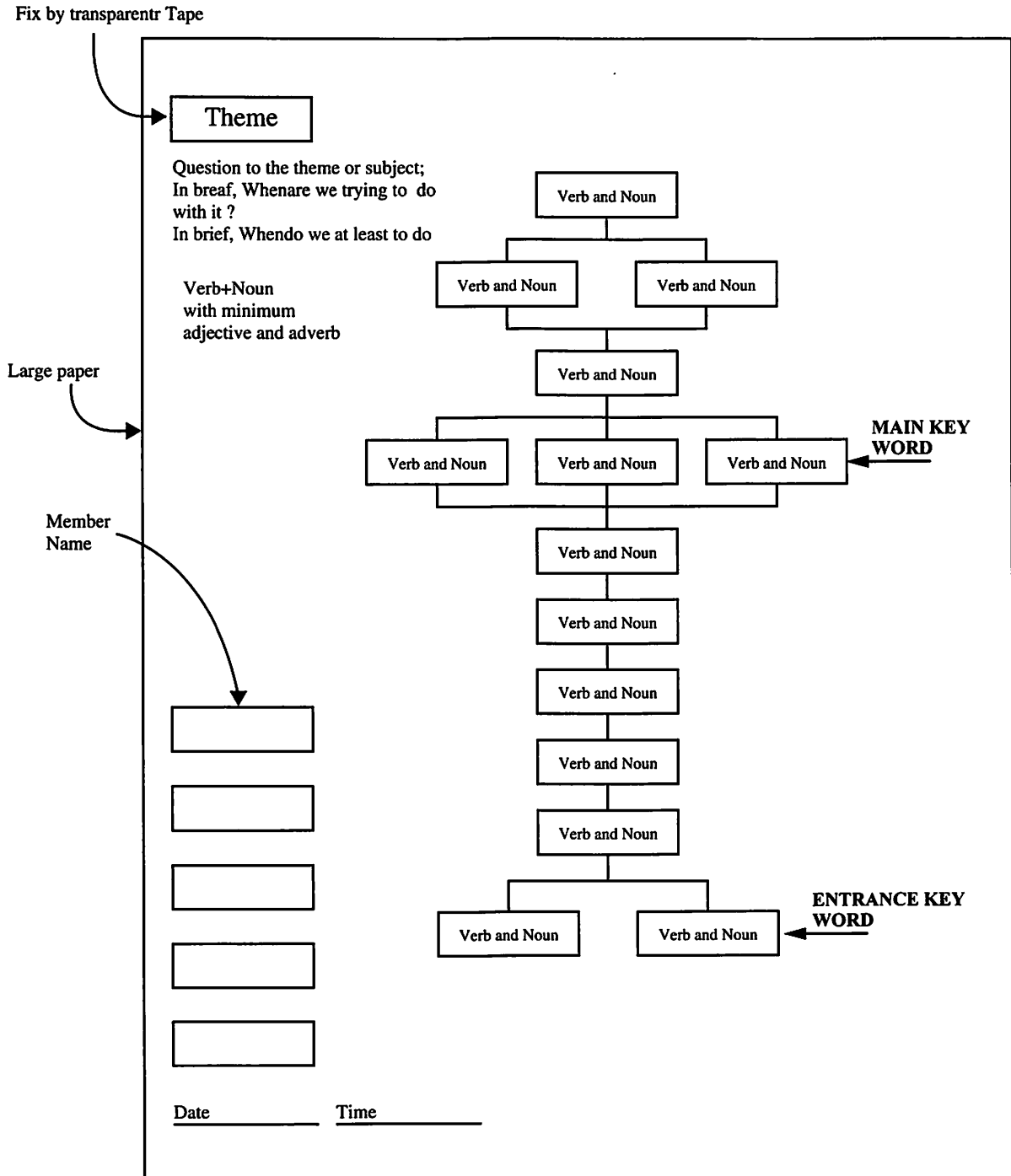
- (1) It asks 2 questions, "In brief, in order to do what are we striving for?" and "In brief, How to go about doing it?". Then, we write all the answers that comes to mind on cards with the expression, "How to do it?" (ie. "Create a PMD", verb with object).
- (2) These cards are compared two at a time and according to the relationship, 'in order to "How to go

about doing it?", "How to do it" they are arranged vertically (ie. 'in order to "Create a PMD", "Write expressions on cards.'). That is, arrange it so that the upward direction will become the purpose and the downward direction will become the means. In the event that you feel a card is needed, write another card and insert it in the appropriate location. Also, if the cards do not have a purpose and means relationship and cannot be aligned vertically, arrange those cards horizontally.

- (3) After the aligning is completed, fix the cards and look them over. The top card is an abstract upper-level purpose, while the bottom card indicates, where one should begin. That is, this bottom expression is called the **ENTRANCE KEY WORD**.
- (4) Now, by looking over the whole list, between the abstract upper-level purpose and the **ENTRANCE KEY WORD** there should be a card that expresses the idea, "In brief, 'by doing this, it becomes the method for realizing the targetted result'." The existence of such a card is the phenomenon of the PMD. This card is called the **MAIN KEY WORD**. If this card cannot be found, then a new card with this role is inserted in the list and the PMD is completed.

By creating a PMD, it does not just clarify the means for realizing the task. Because it is made by all the participants under their mutual agreement, it helps to build consensus of the members. By building consensus, we can attain the same judgment of value and the same behavioral judgment. According to circumstance, it may not be possible to write the PMD according to the appropriate format. In this case, this means that there are no prospects for realizing the task. Thus, this method becomes the initial step in seeing if the task can be realized. However, there is more. This method becomes one of the powerful tools in organizing and solving the relationship of 'purpose and means', an important theme in our society that has existed since civilization. That is, what form should the means have in order to realize the purpose?

**Fig. 2-1 The layout of Purpose Measure Diagram on a large sheet paper**



## **2. Method of creating the procedure for task realization: Steplist Method**

The Steplist method is a method for creating a Faultless Phased Process. It is used to compose the rough purpose and means relationship grasped by the PMD into a specific process. This method can also be used to quickly narrow down what you want to do.

### **Mechanism of the Steplist**

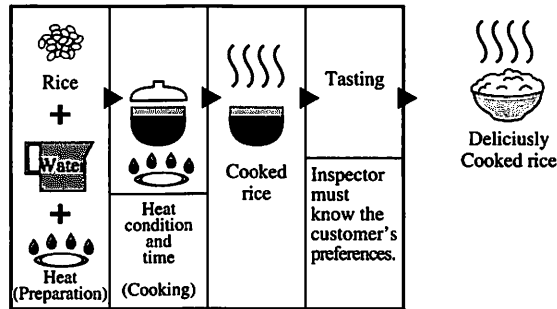
Although the Steplist is a 1-page format, it has the following mechanism.

- (1) Vertical direction: In a Faultless Phased activity to realize the task, there are 8 divided phases. When moving to the next higher phase, the necessary components are added. When the final phase is completed, the task will have been realized.
- (2) Horizontal Direction: The component item of each phase is Faultlessly arranged in an input-output relationship. The output of one phase will become the input of the next phase. However, it is necessary to confirm if the output is useable in the next phase. If necessary, a new component item is added before it is inputted into the next phase.

### **Method of adding component items in each phase**

When trying to add a Faultless component item, if the component brought about by the cause-effect relationship of the input and output is extracted, then the problem is solved. This relationship is indicated by the "cause-effect relationship component of cooking delicious rice" found at the top of the diagram. By referring to this relationship component diagram, I'm sure you will be able to find the cause-effect relationship component of a Faultless Phased input and output.

**Fig.2-2 Outline of the Steplist Management Method (Phased procedure manual)**



Input		Output	
Item	Pre-assurance activity	Item	Post-assurance activity
Item	Operation	Item	Confirmation
	Assurance condition		Assurance condition

Form to extract all development stage operation items.(Steplist)

Item \_\_\_\_\_ Sub-title \_\_\_\_\_

Phased decision plan

Top manager \_\_\_\_\_ Date \_\_\_\_\_  
Promotional secretary \_\_\_\_\_

		A	B	C	D	E	F	G
Segment	Basic step	Step content	Input		Output		Other conditions	Who approved the output to the next step and date of record
			Item	Pre-assurance action	Item	Post-assurance action		
Various thought stage	Inductive stage	1	First information collection	→	→	→	→	
		2	Basic idea	→	→	→	→	
		3	Structuring	→	→	→	→	
		4	Second information collection to back up the structuring	→	→	→	→	
Realization stage	Deductive approach stage	5	Base design or basic matter	→	→	→	→	
		6	Detailed design or detailed matter	→	→	→	→	
		7	Prototype or implementation	→	→	●	→	
		8	Review and correction	→	→	→	→	

Put the name of the goal gained from the key word expression and create a procedure linked with the input in step 1.

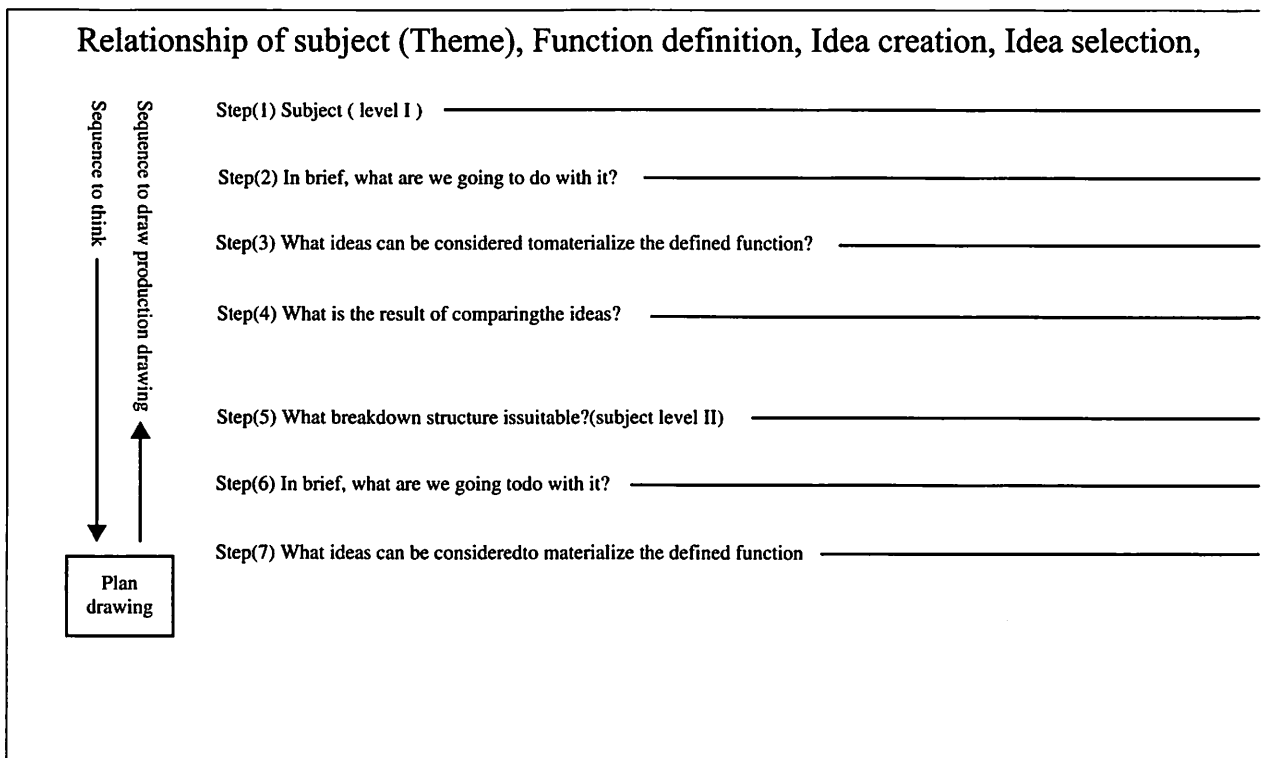
### 3. Method of providing the most suitable solution to tasks of "things" and "systems" that require function and mechanism: FBS (Function Breakdown Structure) Technique

The Steplist is a method for creating a process. It creates an image structure of the mechanism and component (including function) required by things and systems. For instance, by using a Steplist, one can create a timely process for building a house within a certain budget. However, if one wanted to create a house that can stand for 100 years (function and mechanism), the FBS technique can attain the most suitable solution to finding the necessary mechanism and components for such a house. This method is unconsciously used by anyone involved in design. However, by organizing it, it can be used in constructing a new plan and concept of systems.

#### Features of FBS and its process

The conventional concept that "Creativity enters from ideas," is switched to "Effective creativity enters from themes or ideas," when creating a system to produce broader, deeper, valuable pieces of wisdom. This wisdom comes from experience and has been conducted casually. Diagram 1-4 realistically indicates this point in the FBS diagram of "An ergonomic desk for studying". The general

**Fig.2-3 FBS technique: Example of "An ergonomic desk for studying".**



procedure of the FBS is as follows (refer to the left-side (1) to (7) thought sequence and answers).

- ① Establish the Task
- ② In regard to the task, establish the MAIN KEY WORD in brief, "What are we going to do?", and fix the functional representation (use PMD when necessary).
- ③ Create all ideas/image structures to realize the function of the MAIN KEY WORD.
- ④ To realize the objective, narrow down the comparison proposals to 3 or more to compare the effective and efficient ideas/image structures. Then, select one by comparison and evaluation.
- ⑤ Construct the selected idea/image structure as small as possible and make it the task of the next level.
- ⑥ Repeat ① to ⑤ for the task.

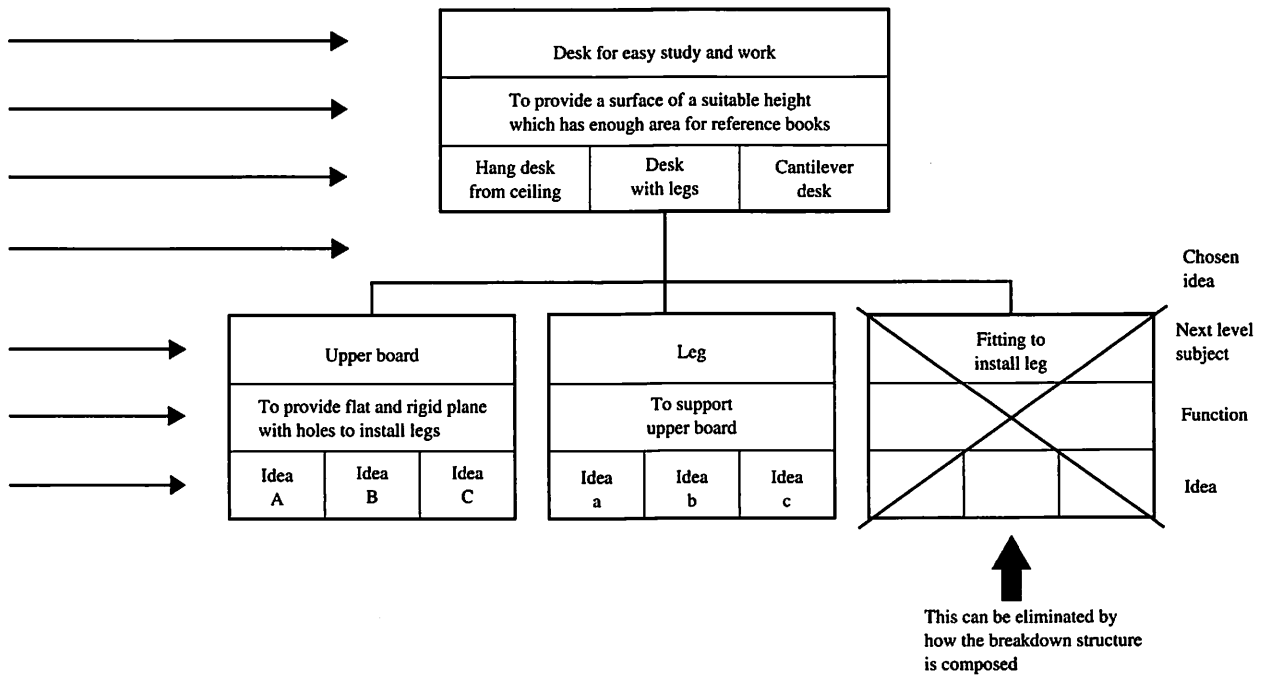
When the results are put to a diagram, they become the Scheme Drawing.

This kind of procedure requires one to have a hands-on experience to fully understand it since it is too difficult to comprehend from just reading about it.

## Chapter 6 Part II

I will give case examples of realizing the task with the "FBS technique: Method of creating the image structure of the mechanism/component of things and systems".

Next level subject by simple example.



where  $\mathbf{A}$  is the  $n \times n$  matrix,  $\mathbf{b}$  is the  $n \times 1$  vector, and  $\mathbf{x}$  is the  $n \times 1$  vector.

1. *Arabis laevis* (Gray) Rollins, *Fl. Brit. Isl.* 1831, p. 104. *Fl. Brit. Isl.* 1831, p. 104. *Fl. Brit. Isl.* 1831, p. 104.

$$A_1 \otimes A_2 \otimes \cdots \otimes A_n \otimes A_{n+1} \otimes \cdots \otimes A_{n+m} \otimes A_{n+m+1} \otimes \cdots \otimes A_{n+m+l}$$

doi:10.1371/journal.pone.0141011.g001

Figure 1. *Staphylococcus aureus* strains used in the study.

CHARTERED ACCOUNTANTS' ASSOCIATION OF SINGAPORE

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and the other two are placed on the ends, producing a central and two side lobes.

From the perspective of the efficiency of the system, the following are the main results:

De Vries, 1997; and van der Vliet, 1997).

Journal of Interpersonal Violence 27(10) 1893-1910

Call at 1-800-4-A-DEVELOPER, ext. 2000 or 2001. Send no money now. Payment enclosed with order.

6. The proposed changes are being made to the following:

1. *Introduction*

subject was required to be held in place by the subject's hands positioned on the sides of the body, 10 cm from the feet.

© 2000 Blackwell Science Ltd *Journal of Internal Medicine* 247: 369–375

...and the other is the ...

[illegible]

4. *Conclusions*

1. 1. 1. 1. 1.

$\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$

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• *Journal of the American Medical Association*, 2000; 283: 2686-2692

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## Part 2

### Five methods for task achievement: contents / how to advance it, and related cases

In part I, the 3 methods of achieving the task described in part II will be discussed. That is,

- (1) PMD (Purpose Measure Diagram)
- (2) Method of Steplist
- (3) The FBS technique will be fully explained.

And, I want to state the method of 2 that supplements it, the 3-5 phase improvement method, and the Implementation Plan.

## Chapter 3 Purpose Measure Diagram (PMD)

### 1. PMD: a birth of a new method

"Asahi Newspaper" one of Japan's leading newspapers reports of the birth of a new method.

"Arrange the means for the purpose: Hold many discussions, and answers can be seen.", Asahi Newspaper wrote an article about the PMD more than 15 years ago. (on the October 25, 1993 issue, Chubu region and International version)

The details were the following.

**Fig. 3-1 Diagram made by the PMD Methodology for the theme, "Become a good reporter"**

When many people are trying to solve a problem, have you ever experienced a situation where "various opinions are raised and tend to fly about", or "no opinions are raised?" For such instances, a method was developed and made practical by Dr. Michihiko Esaki of Gifu City.

The method was presented in Tokyo on the 24th, at the "8th Annual Science Convention of the Research and Technical Planning Society". The method has already been adopted into the government, the National Space Development Agency of Japan, etc., and offers a powerful means to reach the purpose.

The following was presented, "A new method of entering research, development, and materialization by joining the sense of values of the parties concerned." It is a method of creating a procedure to reach the purpose by aligning the opinions of the parties concerned based on a theme. The doorway to this is the PMD (Purpose Measure Diagram) Methodology.

First of all, people related to the theme are gathered. What needs to be prepared is a large sheet and cards. Then, each person brainstorms and writes in the form of "How to go about doing it" (verb with object) for, "What is trying to be done?", "What needs to be done in order to achieve it?" in regard to the theme.

After finish writing, compare each card and try to align them vertically so that the upper card becomes the purpose and the lower becomes the means. When there is no vertical relationship, align them horizontally. All the cards are to be aligned while the parties concerned exchange opinions. When there is a break in the line of thought from top to

bottom, more cards are to be made. In the end, affix using Scotch tape.

By viewing the finished diagram from bottom to top, what needs to be done to reach the theme becomes clear. For instance, I discussed the theme "Become a good journalist" with Dr. Esaki. "Often read the newspaper", "Maintain health", "Take proper sleep", etc. Is it, in order to "Maintain health", "Take proper sleep", or "Take proper sleep" in order to "Maintain health"? The former flows more harmoniously and so "Health" is put above. This kind of selection was repeated and a diagram was completed.

I reached the conclusion that in order to "Become a good journalist", I must "Go to the company early". Cards are to be made by 5 or 6 people. According to Dr. Esaki, "By doing this, it becomes clear what is in the minds of the parties concerned."

Dr. Esaki's Methodology has already been used in the government, etc. The Ministry of Home Affairs and the Emergency Academic Society engaged in a "Lifesaving emergency helicopter system" project and it became a prototype for the paramedics. As can be understood from the article, in the PMD Methodology (Purpose Measure Diagram) the

Fig. 3-1 Diagram made by the PMD Methodology for the theme, "Become a good reporter"

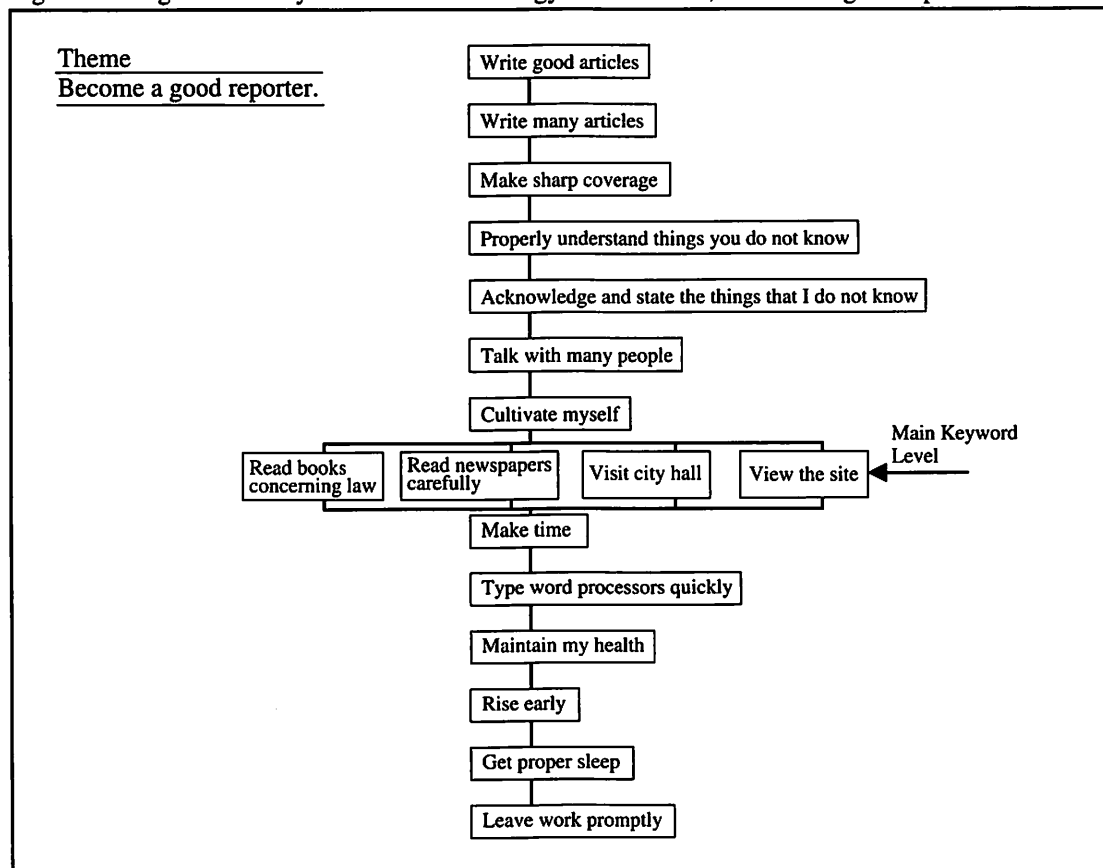
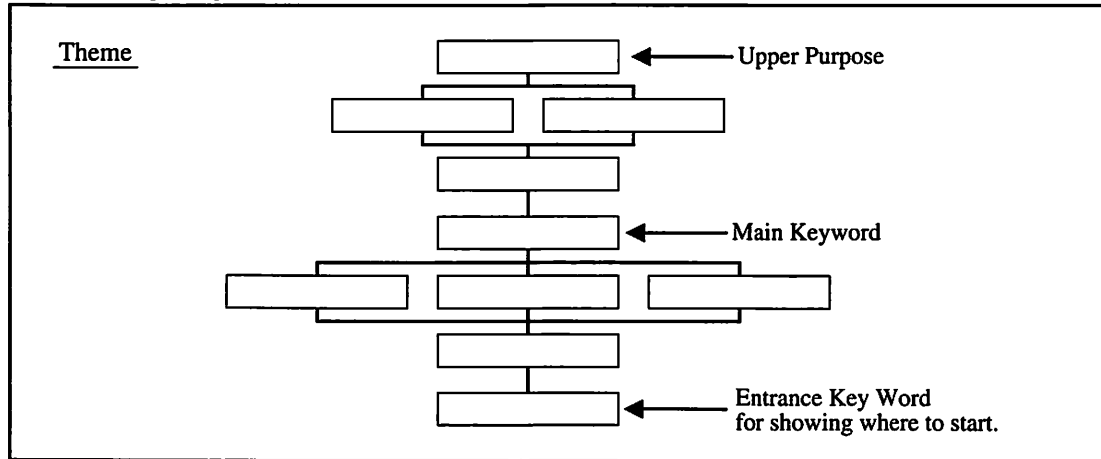


Fig. 3-2 Image diagram of PMD



parties concerned (team members) brainstorm and write according to the task, "In brief, in order to do what.", "In brief, How to go about doing it" and arrange the cards vertically linking the purpose above the means. Also, it can be grasped that the upper target of the task "Focal point of the target (purpose)" and "Doorway to realizing it" is a method to align the vectors of the thoughts between the parties concerned.

The PMD, as well as the following methodologies can solve the problem by embodying the mindset, procedures and actions needed to realize the task without having to consider these things. That is, they clarify the thoughts and actions needed to realize the task. Additionally, they have been developed so that they form a process and the steps can be visualized from start to finish.

Due to the Asahi Newspaper's article, there had been an overwhelming number of inquiries from schools, those in development, managerial positions, Japanese living in Europe and from homemakers asking how to utilize these methodologies for problem solving and task realization.

Back then, I had just retired from Kawasaki Heavy Industries and was employed at the Ishida Foundation. With the support of the chairman, Mr. Ishida Yasukazu, I was able to receive my doctorate degree from the Tokyo Institute of Technology. At the same time, I was inaugurated as a professor at the Asahi University and so due to the drastic changes in my lifestyle, I could not do a complete follow-up on each inquiry.

However, it has been about 15 years since then and the utilization of the PMD in production development, universities, governments, academic societies, etc., has far exceeded my expectations. The effectiveness will be discussed in the following using the results of a related case.

## **2. Related case: A helicopter was utilized as an emergency patient's transport carrier**

Recently, it has become a common place to see on television, etc., a helicopter rushing to a scene of an emergency situation and transporting a patient to the hospital. In fact, the PMD had played a critical role in the introduction of this transport system, though few know of this. The following explains what part the PMD had in its utilization.

\* \* \*

Though I have worked on countless of PMDs, the PMD of the emergency medical helicopter system which was made together with the Ministry of Home Affairs and the Fire and Disaster Management Agency, Rescue Division was one of my most memorable experiences. The reason for this is because it was when the 'prototype' of the PMD was just made (around 1984), and the Ministry of Home Affairs and the Fire and Disaster Management Agency were anxious as to whether the cards would all line up according to 'purpose and means'. However, the PMD performed as I said it would and its effectiveness was a proven success. Due to this opportunity of reforming Japan's emergency medical care program (emergency life saving system), the PMD's effectiveness was again recognized. Thus, in this respect this PMD has a very deep personal meaning.

### **Details of making the emergency medical helicopter PMD**

It was around April of 1984 when Kawasaki Heavy Industries had received a business order to create a market for their recently developed BK-117 helicopter as an emergency medical helicopter. However, to newly create a market where a helicopter was used for emergency care was an extremely difficult task since no one knew where to start. Then, with the guidance of the late Dr. Shigeo Watanabe, who was a former officer of the Ministry of Health and Welfare of Japan, I went directly to the Emergency Rescue Department of the Fire and Disaster Management Agency in late April of 1984.

By the way, there is a principle of meeting government officers (though it is not limited to the government). When you visit the department in charge of the field in question, do not start by saying, "I have a problem and I would like to ask how I should go about solving it.", but rather begin with, "I would like to realize this task and I would like your guidance."

As explained in Chapter 1 'Problem and Task', by pointing out a problem and proposing a

solution for it, without dealing with the underlining cause it will most likely become a never-ending situation where one is continually patching the problems. Also, it is easy to 'disgrace people and shake the organization'.

On the other hand, if you begin by saying, "I would like your guidance in how to realize this task," the government will make some proposals by saying, "How about doing this?" or "How about that?".

With these proposals in mind, I visited the Fire and Disaster Management Agency and said, "The XXXX Government Department's opinion is that XXXX may be a good way of approaching it." Then I continued by proposing, "A PMD method can be used to see the details of the plan, and so let's create a pre-draft."

What followed was the creation of the "Emergency Medical Care by Helicopter PMD". Back then, in regard to utilizing a helicopter for emergencies it was like walking through a dark tunnel as academic societies, insurance companies, administration, etc., were unsure as to which bureau should be in charge of it. Whether it would be the fire department, insurance companies or a combination of them, and to make things worse, there was no mutual place to hold meaningful discussions of it. Without knowing where to start, it was without a doubt a groping-in-the-dark situation.

Then, by suggesting that a PMD be made so that a task realizing proposal could be created, I, Mr. Akio Oyama, the general manager at that time of the Emergency Rescue Department of the Fire Fighting Agency and his assistant Mr. Shinobu Shiikawa, the three of us made a PMD similar to what is shown below in about 2 hours. After looking at the completed PMD, the general manager of the Emergency Rescue Department happily commented, "Although we have repeated held many internal discussions so far, our ideas for an emergency medical helicopter could now for the first time be effectively organized."

### **Outline of the Emergency Medical Helicopter PMD.**

Back then, there were up to 30 items that needed to be considered for the emergency medical helicopter system, and the person in charge of administration did not know how to structuralize them. Then, the structuralization was tried by the PMD.

The Domain Of Consensus (recognition and verification points) that this PMD expresses was not only for the construction of an emergency critical care system by helicopter, but it offered the

first clue for the improvement of the lifesaving/recovery rates of the whole emergency critical care system. That is, from block No.29 in this diagram "Decide the target value (each division coverage from 15 to 30 minutes) of the emergency helicopter transportation." a proposal document was submitted by the Japanese Society of Reanimatology and the Japanese Society of Anesthesiologists to the director general of the Fire Defense Agency "Regarding the establishment of the emergency critical care starting set point" (Prof. Okuoki in December, 1984). Moreover, the catchphrase "First aid for those that can be saved." was started among the parties concerned.

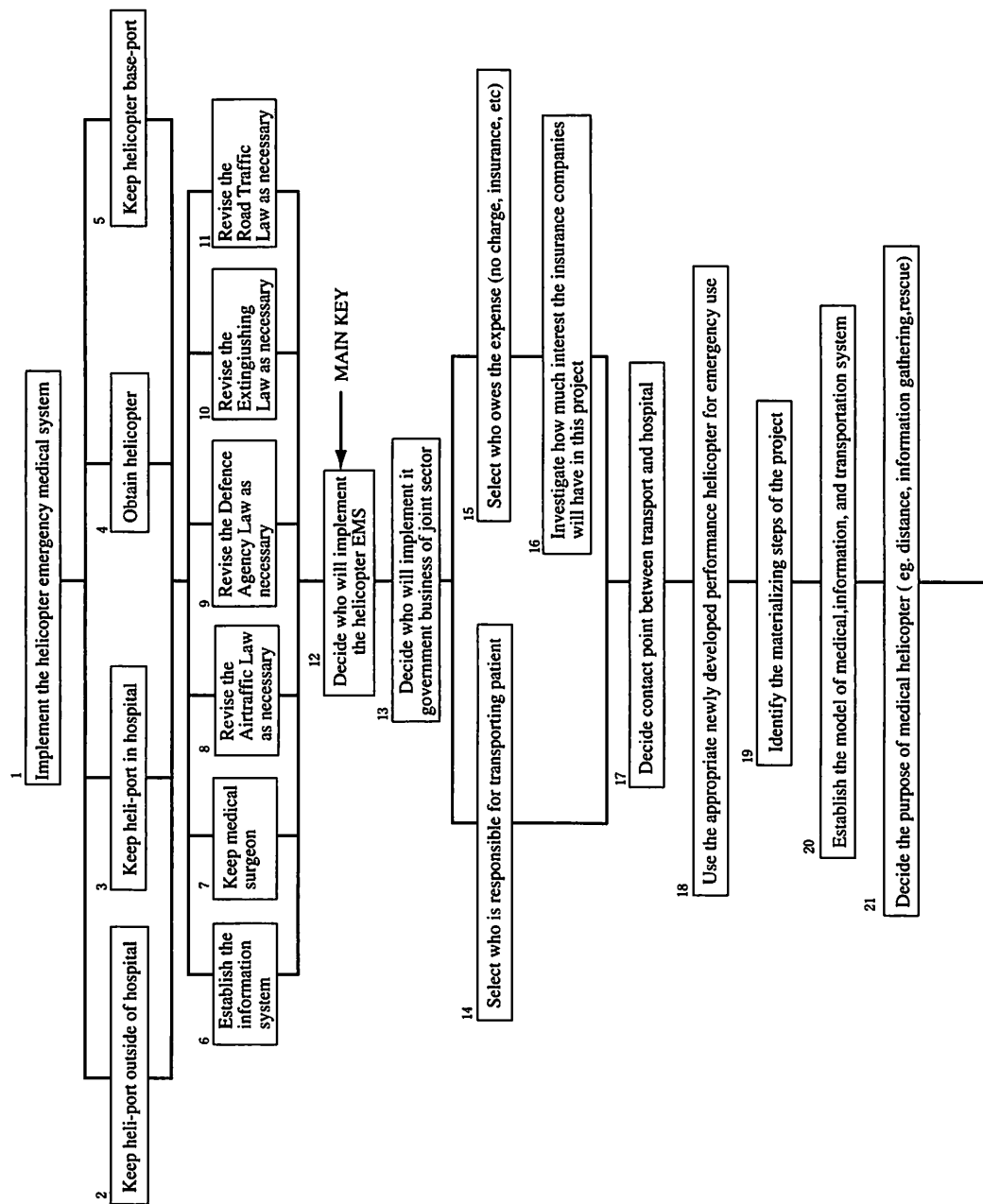
Thereafter, many academic societies and organizations began using expressions such as that found in block 30 "Clarifying the significance of the on-site physician (case study)" in their study/research, and the doctor's substitute or supplementary system for on-site emergencies became one of the starting points for the enactment of today's emergency personnel system.

### Theme: Emergency Medical Helicopter

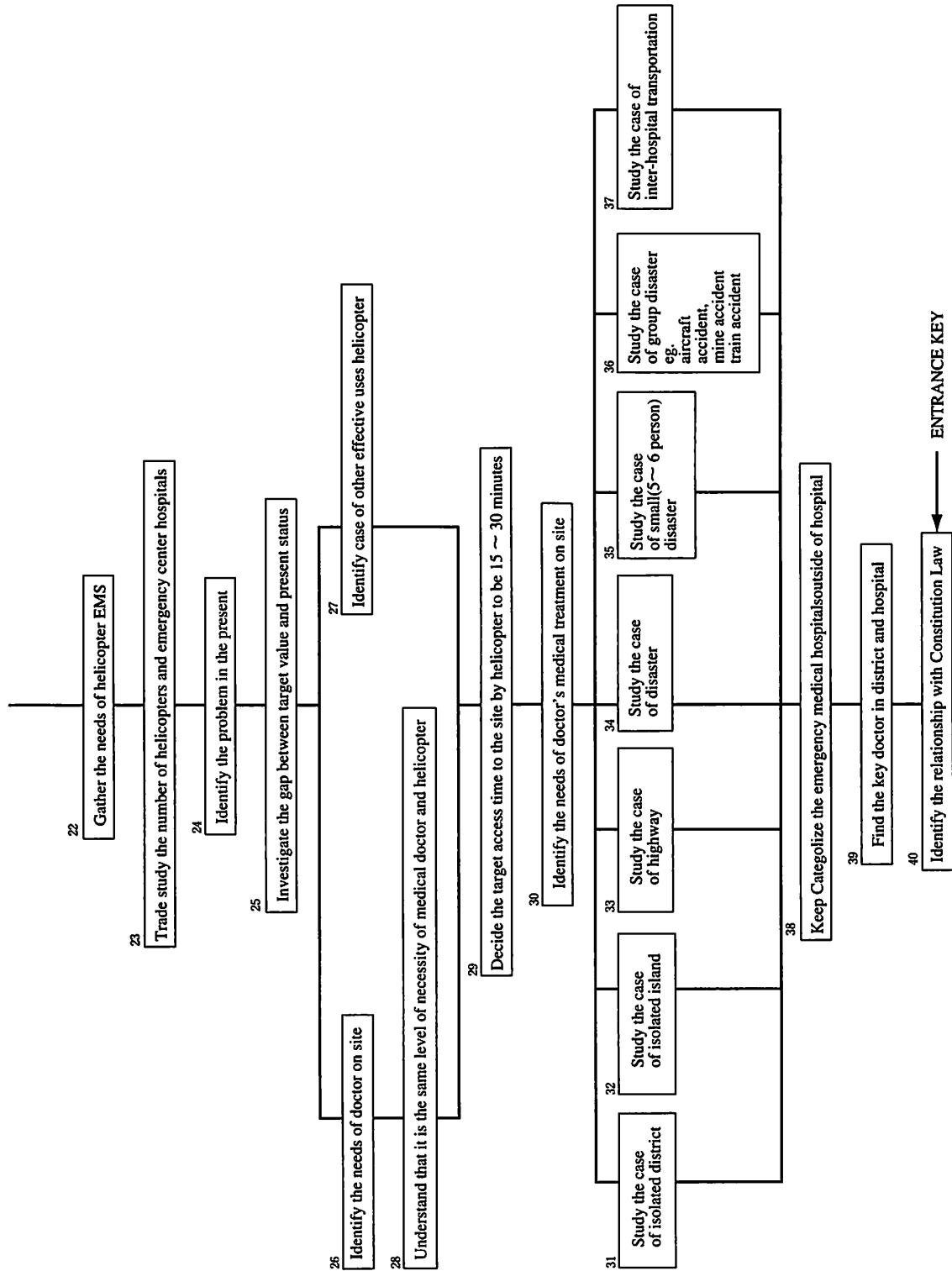
PMD of how to realize the helicopter emergency medical system in Japan

1984-5-8

Fig 3-3 PMD for Helicopter Emergency Medical System







### **3. Procedure of the PMD (Purpose Measure Diagram) Method**

Here, I would like to show the specifics of the procedures of the PMD methodology. First of all, the target of developing this methodology was to align the vectors (direction of thought) of those related to a project and accomplish the task based on the same sense of value. However, after creating many PMDs (Purpose Measure Diagrams) in various situations, the results far exceeded the intentions that I created it for. I would like to state the significance at the end of this section.

#### **【Procedure Making】**

As stated in the introduction, the terms problem and task are very similar and are usually not clearly differentiated. Moreover, although both may be acceptable when the word 'problem' is used it causes the thought process to be broken off at that point in time. This is because when a task of doing something arises, then a problem occurs. Therefore, this PMD method switches the term "Problem" to "Task" and does the necessary work on realizing the task.

#### **【Things to prepare】**

(1) Cards: In short phrases, use an expression 'how to do it' (verb with object) and write it out on cards (state in detail in the paragraph of the procedure). It is convenient to use long cards that are slightly thick and have a width of about 8 cm. It is better to have no adhesives on the back. Write all that comes to mind in short phrases "How to go about doing it" (verb with object) without worrying of the order as they will be separated later. It is better to use different colored cards to differentiate the writers of the cards. Moreover, for each item a dot is written at the start (left end) of it.

Large sheet: a large sheet of paper used as a mount for arranging the cards in order and later fixed with mending tape (or equivalent where the tape is almost invisible and can be written on with pencil).

(2) Mending tape: After arranging the cards, use this tape to affix onto the large sheet of paper. As it is often the case that tapes generate static electricity, use your finger or another part of your body to touch along the surface of the tape to ground the electricity so that when you use it to affix the paper, the paper will not bulge upwards but lay flat on the large sheet.

(3) Scissors: Used to separate the card with the expression "How to go about doing it" (verb with object).

## **【members】**

Although it is possible to do it alone, usually two or more people (up to seven) are preferred. When there are more than seven, it becomes physically difficult to work with the cards. Therefore, when many people are making a PMD with the same theme, 5-7 or less parties concerned including representatives are divided into groups.

When there are more than 2 people in a group, elect a leader (coordinator). The leader indicates a pair of cards at random and compares the expressions of the cards. With the consensus of the other members, the leader arranges the cards in vertical order according to a 'purpose and means'. After completing this preparation, it is finally time for the procedure to see how the PMD method should be advanced.

### **PMD Procedure**

- (1) Confirm the theme (task) among the parties concerned (team members).
- (2) Ask the following 2 questions to the parties concerned in regard to the theme (task).
  - A. In brief, "What are we trying to accomplish with it?"
  - B. In brief, "How does one go about doing it?"

And the answer to either of the questions should be phrased in such a way that it will answer "How to go about doing it?" (verb with object) and written down on the cards. Although in the beginning it is acceptable to write everything down until one's ideas are exhausted, a good technique is to write in such a way that the contents of the cards will gradually become more and more concrete as to what needs to be done.

- (3) Separate the written expression items by cutting them out with scissors so that they will become independent.
- (4)-1 First of all, arrange 2 arbitrary cards that have been separated on the sheet of paper in a vertical fashion so that they will be connected in regard to a 'purpose and means' relationship. That is, 'Do...' in order to 'How to go about doing it' 'verb' in order to 'verb with object'. When one is unsure as to the vertical ordering, take the 2 cards in question and compare which is the higher-level purpose and which is the lower-level means to achieving it. Based on the first two cards, consider whether the remaining cards are related as the purpose or means and arrange them one by one following the vertical format.
- (4)-2 Only when the cards do not seem to align vertically, line them horizontally.

- (4)-3 When there are two or more places where similar expressions are needed, many processes can be made clear by using the terms pre-pre-draft, pre-draft, draft and decision. In this case, by separating the cards into 'Decide on the pre-pre-draft of the ...', 'Decide on the pre-draft of the ...', 'Decide on the draft of the ...' and 'Decide on ...', it will work towards finding a solution.
- (5) When the arranging is finished, once again from top to bottom read out the cards repeatedly and see if the upper contents match the lower such that it form a purpose and means connection. For example, in order to do 'verb with object' (upper card), do 'verb with object' (lower card). If the relationship is not connected, rearrange the cards and/or make more cards.
- Next, check whether the relationship is connected when reading the cards from bottom to top. Verify the order by reading the cards 'do A' first and then 'do B'.
- (6) While rearranging the cards, when necessary rewrite the expressions or add more cards. When you realize that another card is required but no good expression comes to mind, place a blank card there and continue. Afterwards, continue thinking about what expression is needed there. When you realize that cards with ambiguous expressions exist, repeatedly ask yourself "What does XX card mean?" and "What does it involve doing?" and make another PMD with just those cards. By doing so, it will clarify the meaning and the places of those expressions (location of cards). Moreover, when the expressions are similar do not stack them or throw one of them away as done with the KJ method. It is of the utmost importance to stick to the rule of keeping the 'purpose and means' relationship to the end.
- (7) When the above-mentioned results are attained after the rearranging and adjusting, fix with mending tape.
- (8) Carefully look at the cards that have been fixed. Then, find the most appropriate expression label "In brief, do ..." which includes the upper and lower meanings of what the task is trying to convey. The found expression will become the "MAIN KEY WORD".
- (9) Next, find the card with the expression that will become the "ENTRANCE KEY WORD" which will tell where to start. Usually, that will be the card at the bottom, but if you feel it is not a suitable expression then think of an expression which will tell you where to start by again making another card stating "How to do it" and putting that at the very bottom. The ENTRANCE KEY WORD may be a single expression, but it may also be a multiple one. When there are multiple expressions, there will be a division of labor.
- (10) When the sheet is finally completed, on the blank space write the date when the sheet was made, the names of the members present and the time frame when the work was done.

- (11) The completed sheet is configured such that when reading from top to bottom, each expression is linked to the lower one by a 'purpose and means' relationship, respectively, and from bottom to top a rough procedure can be seen.

The PMD is advanced based on mutual agreement of all parties (not by a majority decision). Common sense will make people doubt how the PMD was made in a relatively short period with the consensus of all the members. As in the case of a pope passing away, before the new pope is elected even the conclave requires a few days to be locked in a meeting to make a decision. Even then, the decision is not unanimous, but rather only two-thirds of the members need to be in agreement. If the PMD method is used, all will be in agreement. The reason for this is because the PMD is made using the following method.

When a large number of people are going to make a PMD, a team leader is elected as stated previously. Although a leader, this individual does not lead the team but brings out a basic plan and plays a role in coordinating them. The leader places the cards "How to go about doing it" written by the members where all can see them and reads out the contents. And then, the cards are placed in the most suitable places according to a purpose and means relationship. When the whole team agrees to the location, the next card is focused upon and the whole process is repeated. However, when some do not agree upon the vertical ordering, all members must explain why they think the purpose and means relationship is correct or incorrect.

Next, after listening to these explanations return to the starting point to the level of the first card and without any preconceived notions (regarding the just heard explanations), begin voting again the top-down relationships of the cards and exchange opinions until all parties acknowledge and agree upon them (In this case, if necessary change the expression of the cards or add an explanation to it.).

Since the purpose and means are connected based on a natural cause-effect relationship, as long as one can understand what the other member(s) are trying to say, all parties will reach a mutual agreement in the end. In making a PMD, when all parties cannot reach a consensus in their opinions, there is some reason for it and so the thorough exchanging of opinions as mentioned above becomes the principle.

Furthermore, pertaining to the explanations as to why the top-down relationship is correct/incorrect, intentionally ask questions with "Why?". The reason for this is because those who think they are correct are assumed to be basing their opinions on a cause-effect or on a

purpose and means relationship, and so by asking "Why?" it will make their reasoning or point of view understood among the parties concerned.

### **How to differentiate the MAIN KEY WORD and ENTRANCE KEY WORD.**

To find the MAIN KEY WORD and ENTRANCE KEY WORD, I think it is difficult to do so at first. As was mentioned above,

#### **MAIN KEY WORD :**

What the task is trying to say, "in brief, do ... ", which includes the upper card's meaning (purpose) and the lower card's meaning (means) and is the card with the most appropriate expression.

#### **ENTRANCE KEY WORD :**

This is the card which expresses where to start in order to realize the target and purpose.

I would like to explain this using an example.

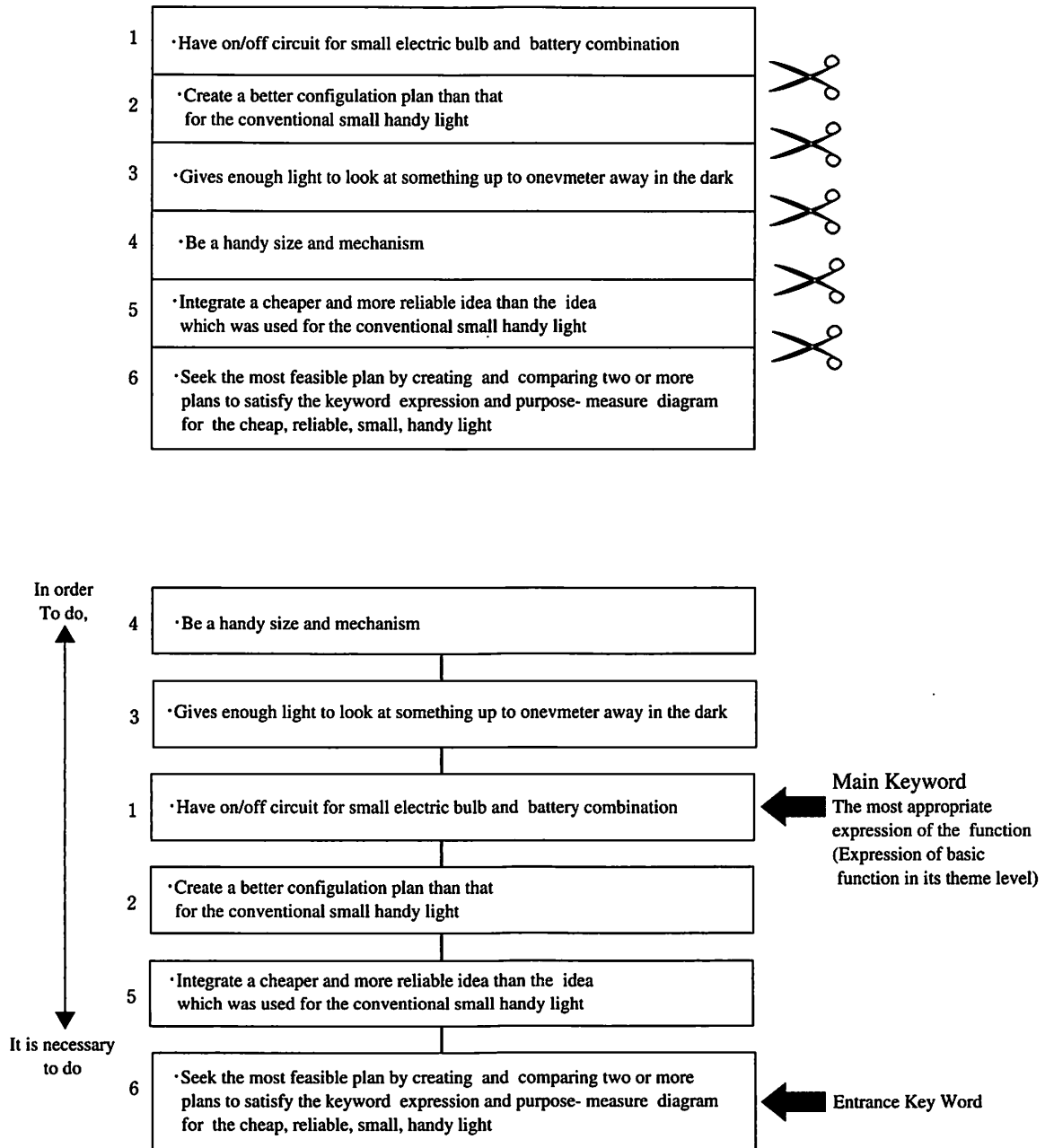
Task: See the 'Developing a small flashlight' diagram.

The 6 cards in the upper row were written at random, in brief "How to go about doing it ". The numbers on the left were written just for convenience' sake to know where they will be located when making the PMD. These 6 cards arranged in a purpose and means relationship is the lower diagram, that is, the 'Developing a small flashlight' PMD.

After carefully viewing this diagram, I think you will agree that the expression "Use the minimum number of batteries and make an on/off switch for the light bulb." as the MAIN KEY WORD is the most appropriate expression that connects the upper and lower meanings. Most of the MAIN KEY WORD expressions are found in the middle as in this diagram (However, sometimes it appears in the upper levels.).

Next, the ENTRANCE KEY WORD which states where to start, is the No.6 card "Create a minimum 2-3 proposals for the small flashlight (inexpensive, reliable and small) and from there compare and find the feasible realization proposal." Moreover, if you still cannot find a suitable expression, think about an expression that would state where to start using "How to go about doing it " and place that at the very bottom.

**Fig. 3-4 Development of a handy flashlight**



#### **4. Effectiveness of the PMD**

Although you can get the general feel of the PMD by actually making one, based on the comments received by many people the following can be stated.

◇ **After arranging the cards according to the purpose and means relationship by all the participants, the PMD can visually indicate the 'Direction of Value' (Direction of intent) as follows.**

(1) The PMD can build a consensus of all the participants.

The consensus building is made possible by the creation process of the PMD. In other words, consensus is built due the creation process as the cards written by each person is read out loud and placed vertically from the top according to a purpose and means relationship with the agreement of all the participants.

(2) As a consensus is built, regardless of the creators being an individual or a group, the value and action criteria is formed. When a group of individuals join strength and move in the same direction, we have frequently seen or heard what can be called 'a miracle' happen.

Although it may be the same industry making the same kinds of products, some companies can show a great difference in their achievements because the employees have united their thoughts in the same vector (direction), and the results can be controlled by the amount of action taken. Although it is often said that the greatest distress of a manager is when the employees do not fully understand the intentions of the manager, it can also be said that the manager has not taken into consideration the employees' opinions. To solve such a dilemma, the PMD is extremely effective in solving the worries of both sides.

(3) When the purpose and means relationship is indicated, the direction of value (direction of intent) can be seen visually. In other words, the most appropriate steps in achieving an objective will become clear. To take measures of a robust and an appropriate means in regard to the purpose is to point the organization or group to a correct future direction. Consequently, it will point the organization or group towards a path that will guard their existence in the future.

(4) The relation between words or phrases that have been conventionally ambiguous are now made clear by the 'purpose and means' and procedure-type formats, and with definitions that can now be added.



- ◇ **In order for the expression, "in order to 'Do...', 'Do..' is done" to be linked from the top to bottom, a procedure to realize the conditions of each layer is necessary. One action plan (procedure) will be required. (Therefore, it is necessary to use the "Steplist Method" in Chapter 4 to create the procedure of a Faultless Phased activity and decision making.)**

Therefore,

- (1) A phenomenon occurs where the MAIN KEY WORD "Only ... needs to be done." is usually found in the middle position of the PMD.
- (2) Moreover, the ENTRANCE KEY WORD which realizes the MAIN KEY WORD is found at the bottom expression of the PMD.
- (3) In the purpose and means relationship, there may be action expressions that must be carried out at the same time, and may cause empty arguments as to which must be done first. However, with the PMD this kind of situation can be avoided. That is, when expressions are on the same level within the PMD, they are aligned horizontally. Moreover, another new related expression (action) can be used to take the place of those previous expressions and become the solution to the dilemma.
- (4) What was conventionally in the region of concepts, that is, philosophy, science, engineering and management, can now be made into a procedure.

- ◇ **It is possible to grasp a rough framework for the procedure showing where to start.**

Therefore,

- (1) An escape from the state of chaos in task realization and problem solving can be achieved.
- (2) If a theme is adopted when a PMD cannot be made, that implies that it will not be realized since the laws of nature (cause-effect relationship) will not be utilized.
- (3) By being able to have a bird's-eye view of the overall framework, the partial and entire relationship can be understood. While seeming to be a correct decision on a segmental level, when viewed from its entirety, it may be seen as a mistake and thus a grave error avoided. It is extremely effective for making a decision in administration policies.
- (4) It becomes possible to grasp the process of the clientele and order schedules, which is conventionally known as the 'Black Box' in business. That is, it becomes possible by making a PMD on the basis of combining the Steplist, FBS and Implementation Plan methods (will be described later) in a coordinated fashion.

Although the above-mentioned effectiveness of the PMD over various fields and its diversification can be attained through the making and creation process of the PMD, if one has no experience in creating a PMD, there may be some doubt as to its truth in the person's mind. However, those who have experience will unanimously state that they have attained these results.

In 1994, the government representatives of each Ministry participated in a computer utilization lecture, and based on the above results, the Technology Research Association and the Peripheral Research Group reported the following in regard to the PMD. This workshop is made up of 48 government authorities including the Ministry of International Trade and Industry. Its main concerns are determining the ideal specifications for procurement and developing the Logic Design method. The report states that each Ministry's data processing management department should refer to the PMD methodology.

## 5. Exercise: Training sheet for creating a PMD

Let us begin our exercise in making a PMD. Once the art of making a PMD is understood, when you encounter a situation where you need to realize a task, you will be able to easily create the Purpose Measure Diagram (PMD). From there, you will be able to grasp the overview of achieving the task and find the MAIN KEY WORD (know 'what' and 'how to go about doing it') and ENTRANCE KEY WORD (know 'where to start'). This PMD training sheet will teach you hands-on about these things. I will explain about the usage of the training tools.

First of all, make an enlarged copy (B4 size: 250mm × 353mm; 9.8" × 13.9") of the table seen on the upper left hand of the frame using thick paper. Then, cut along the frame and make each card independent. Then, by referring to the PMD creation mentioned above, the cards will be arranged from the top on a A3 sheet (297mm × 420mm; 11.7" × 16.5"). Though this will be repeating the creation process, if I were to review how to easily make a PMD, it will be as follows.

- (1) First of all, put the card labelled, "Theme: creating a PMD" on the upperleft.

This will become the theme (task) of this PMD.

- (2) Arbitrarily pick 2 cards and see which one will become the purpose and which will become the means by saying to yourself in order to do (one of the cards), I need to do (the other card). Of course the 2 cards will most likely not be sequential, but it will be obvious which will need to be done first in order to achieve the final objective. Then, line them vertically on the sheet so that the card that needs to be done first will come on a lower level (Remember, the first action or process that will realize the task will be found at the bottom of the vertical list.).

Then, pick up another card and see where it should be located by repeating the above method (Ask yourself if it should be located above, in-between or below the two cards already set on the sheet). Keep repeating this until all the cards have been placed on the sheet.

- (3) By repeating this process over and over again, the PMD for "Theme: Creating a PMD" will be completed. Refer to the right side of the page for a sample PMD. However, first make your own PMD without referring to this example.

Only after reaching the completed phase of your own PMD, refer to the example to adjust and to understand the correct method. Similar to riding a bicycle, it may seem difficult at first until you grasp the technique and then the PMD creation will become smooth.

(note 1) Bring the No.7 card "Summarize the completed PMD and make it the EXECUTIVE PMD (for your superiors)" to the very top.

(note 2) Though cards 9, 13 and 1 can be aligned vertically, line them horizontally as in the sample PMD.

**"Specifications Design Methodology for the system procurement and Logic Design Evaluation Methodology of the supplier"**

**(May, 1994. Descriptions concerning the PMD is excerpted.)**

In other words, from a state of complete chaos, this methodology will allow you to draft standard objectives with the consensus of all participants. Most of the participants who used this methodology to create the Implementation Plan draft were able to clearly visualize the standard objectives of the system. It clarified at what level their opinions were considered by looking at their locations and similarly, confirmed how the opinions of many people affected the direction of the whole system. That is, in this gathering of many people from various positions, the PMD helped to establish a system's standard objectives without catering to any one's own wishes, but taking into consideration the wishes of the whole and made it possible to coordinate the original objectives of the system. And, this was all accomplished in a public environment (among the participants), consented and confirmed.

Having the PMD as the most initial phase of the project with the intentions of all the participants unified, it creates a situation that is most suited to draft the characterization and standard objectives of the system. The PMD's strengths are most demonstrated when there is a difference in opinions among the parties concerned, when no one knows what to do, etc., and especially when the confusion is great, its effectiveness is most seen. Moreover, preparation is almost unnecessary.

The PMD creates a relaxed situation where all participants brainstorm their ideas and opinions, insist upon them, listen to other members' reasoning and argue them, and come up with new ones. On the other hand, when it is clear what needs to be done it is not necessary to create a PMD. However, as the project progresses, if the statement of principles changes or becomes ambiguous, then it is advisable to create a PMD together with all the parties concerned with the original intentions towards the project. Moreover, while making the most of this feature, the PMD can present a three-dimensional specification, and be used as a new expression method.

Let us now make an actual PMD. First of all, begin by carefully reading the explanation written in the next chapter 5. Then, by using the PMD Training Sheet, gain experience in making a PMD.

## 6. Various styles of the PMD

By following the directions of the above-mentioned a PMD will be created, however, depending on the task and participants involved, various kinds of PMD will be formed. Here are some examples for reference.

### (1) A PMD with blank cards.

The PMD (Diagram 6) for the task: "A good field day." is based on what was discussed between the students and the homeroom teacher and made by that teacher and myself. During the creation, when there comes a time when you feel that there is a step missing in the link, place a blank card there (the upper left side of this PMD). Then, by viewing the completed PMD, keep thinking what to write in the blank card to make it coherent with the other cards. When you find the answer, write it on the card.

Moreover, although there is an idea box on the upper right, this is used when several ideas come to mind yet it is unsure which one to pick as any one of them may be chosen to fill the card. By using this PMD, the teacher and the students can see and understand exactly what part of the task as a whole is being discussed and it becomes a convenient road map. If the blank cards are not filled, then the cards connecting the upper purpose and lower measure will not be embodied.

### (2) A PMD that organizes vague relationships

In our daily life, we encounter problems that have vague relationships such as "Which came first, the chicken or the egg?". To organize such relationships, the PMD can be used. Two examples will be shown here. The important point here is to compare and decide which relationship is a stable one.

In example (1), B is more stable. This is because both the chicken and the egg can be obtained. However, it should be amended so that this chicken that needs to be obtained is the hen's mate. In example (2), it is not possible to state which sequence will produce a smooth relationship. In order to "Reduce the cost a second time", "Sell a lot" and in order to "Sell a lot", "Reduce the first cost" the two PMDs are connected by adding the first expression on top and the second expression on the bottom. (Fig. 3-7)

### (3) A PMD that makes joint development a smooth process

Joint development between enterprises is an active business. Though an outsider to the projects, it is not difficult for one to imagine that the companies are faced with many problems.

The next PMD concerns the XT-4 medium training aircraft which was jointly developed by

Kawasaki Heavy Industries, Mitsubishi Heavy Industries, and Fuji Heavy Industries. When the 120 members of the design team did not know where to start in order to achieve the task, this PMD was created by 10 of the constituent members. By making several of these PMDs, the joint development was underway by quickly realizing the starting point of the design (Fig. 3-8).

Fig. 3-5 (1) Training sheet for making a PMD

(Note) On this teaching material, the numbered order is shown on the left-hand edge, but normally this is not required.

<p><b>Theme: Making a PMD</b></p> <p><b>Question</b></p> <p>1. In brief, what are we going to do with it?</p> <p>2. In brief, at least what is necessary to do?</p>	<p>15. Once the PMD is completed, confirm whether or not the top-down order of the expressions are appropriate by reading out loud, "In order to do A, it is necessary to do B." (Adjust if necessary.)</p>
<p>2. The theme candidates are to be written as a noun or noun phrase. Example: "Making of a PMD" or "To make a PMD" However, if given the choice, "To make a PMD" is the better expression for a theme.</p>	<p>16. Make the feasibility of the subject compact so that it can be seen by all.</p>
<p>3. Decide the theme.</p>	<p>17. Choose the cards randomly.</p>
<p>4. Read the pamphlet about the mechanism of decision making by information of difference in the DTCN/DTC Methodology book.</p>	<p>18. Create a PMD (pre-pre draft).</p>
<p>5. Write the answer to the question of, "What are we going to do with it?" in the expression of, "Do A" (verb+noun). (An asterisk is to be written at the start of each expression.)</p>	<p>19. Place a blank card when there seems to be another expression that needs to be added.</p>
<p>6. Using a scissor, cut the written expressions to make them independent from each other.</p>	<p>1. Grasp the expression "Do B" as the entrance key word to determine the starting point where we should start.</p>
<p>7. The completed PMD will be used as the master PMD. It is then necessary to summarize it and make a summarized PMD to show higher ranked persons in the company</p>	<p>20. Place the idea box under the "To do box" when ideas are created/ thought up for one of the expressions on the same level.</p>
<p>8. The written expressions must be placed vertically from top to bottom according to the sequence of "In order to do A, it is necessary to do B."</p>	
<p>9. Be able to visualize the priorities of the parties concerned.</p>	<p>21. When a difference of opinions arises as to deciding which expressions are the purposes and which are the measures, the individual(s) who disagrees must clarify why their ordering is more appropriate than the leader's. Then, readjust.</p>



10. Place cards horizontally, those expression cards which cannot be placed vertically.

11. Locate those expressions that are located on the same level from the left-hand sized according to the level of fundamental principles / importance.

12. When reading the cards from bottom to top, the expressions can be read by repeating, "Do B, then do A."

13. Grasp the main key word of the purpose image of the objective result, which in brief will achieve the subjects. It should be expressed as "Do A" (=verb+noun).

14. When a difference of opinions arises as to deciding which expression is the main key word, the individual(s) who disagrees must clarify why their own key word (the expression of the objective result) is more appropriate than the leader's.  
Next, without being caught up in one's own opinion, one needs to listen to the other person's opinion. Then, if there is a standstill, to make a vote again.  
This is repeated until there is agreement between the parties concerned over the main key word (the expression of the objective result). (In this case, there may be cards where the expression may be changed or added.)

22. Add cards in cases where cards need to be readjusted or are insufficient

23. When a similar expression is required in two or more places, place the expression, eg. "Do A, the first time.", "Do A, the second time." or "Make the pre-pre draft", "Make pre draft", "Make draft" and "Make decision".

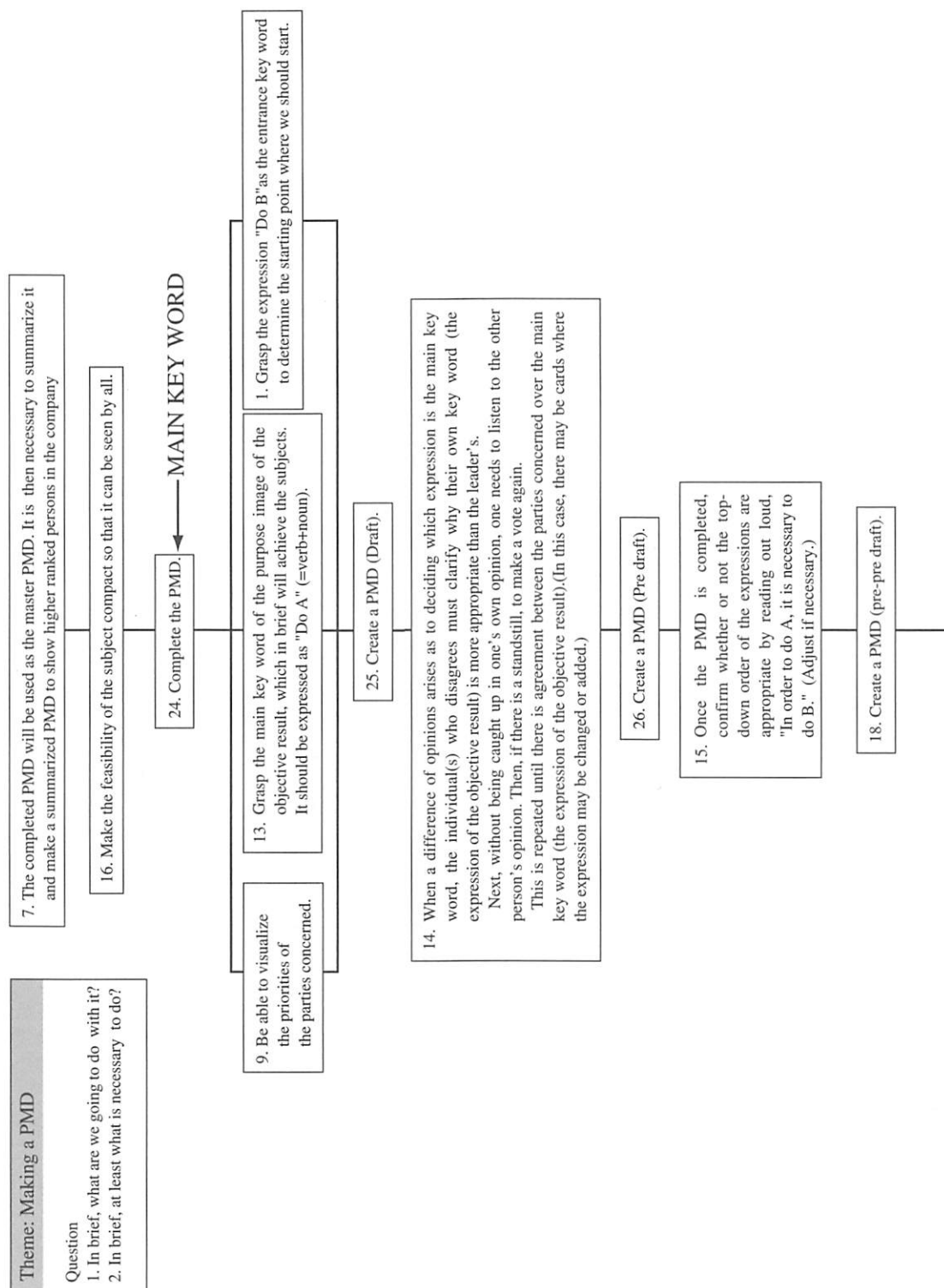
24. Complete the PMD.

25. Create a PMD (Draft).

26. Create a PMD (Pre draft).

27. By using the theme PMD method, create the best theme expression.

Fig. 3-5(2) Completed sample



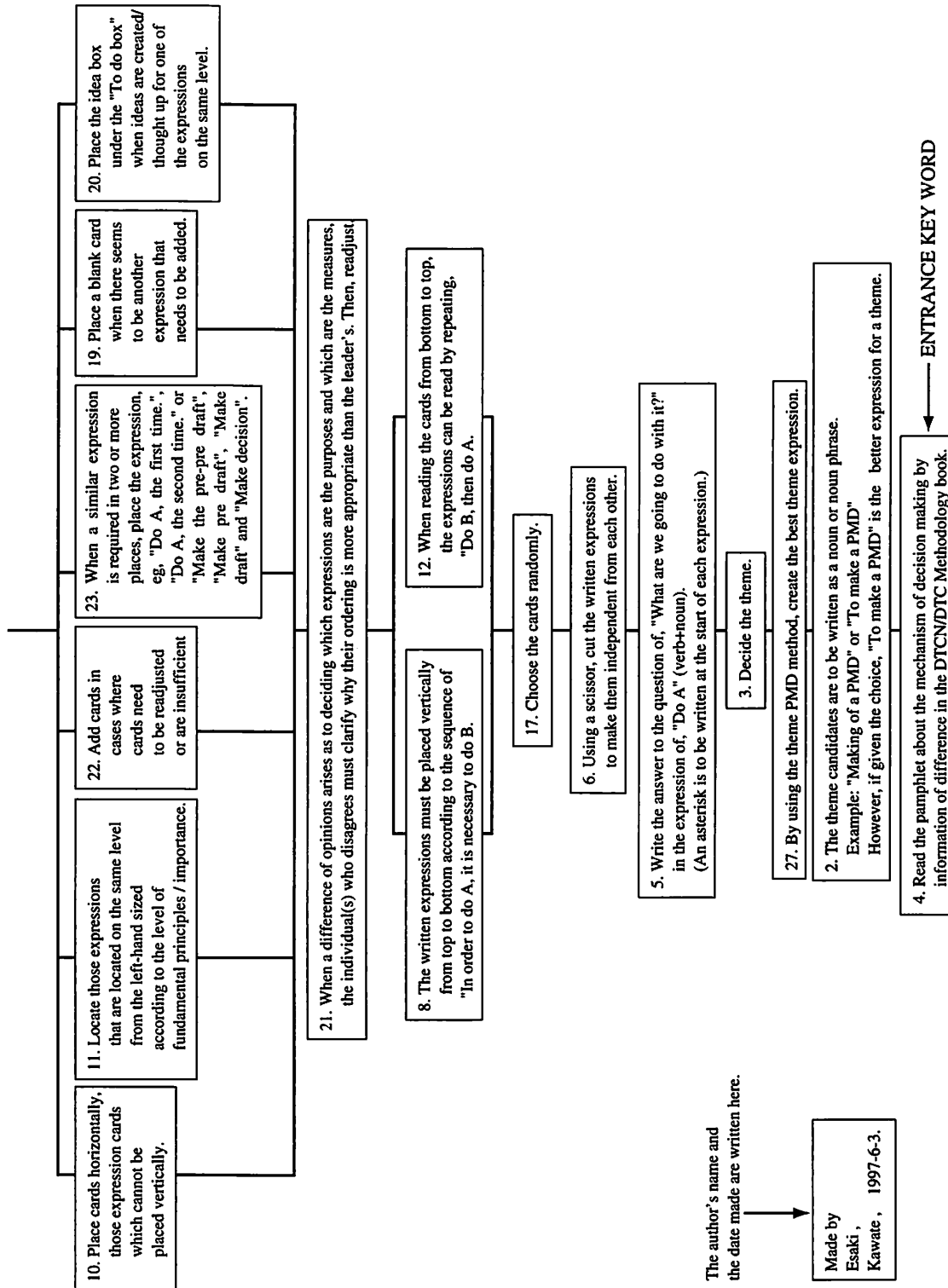
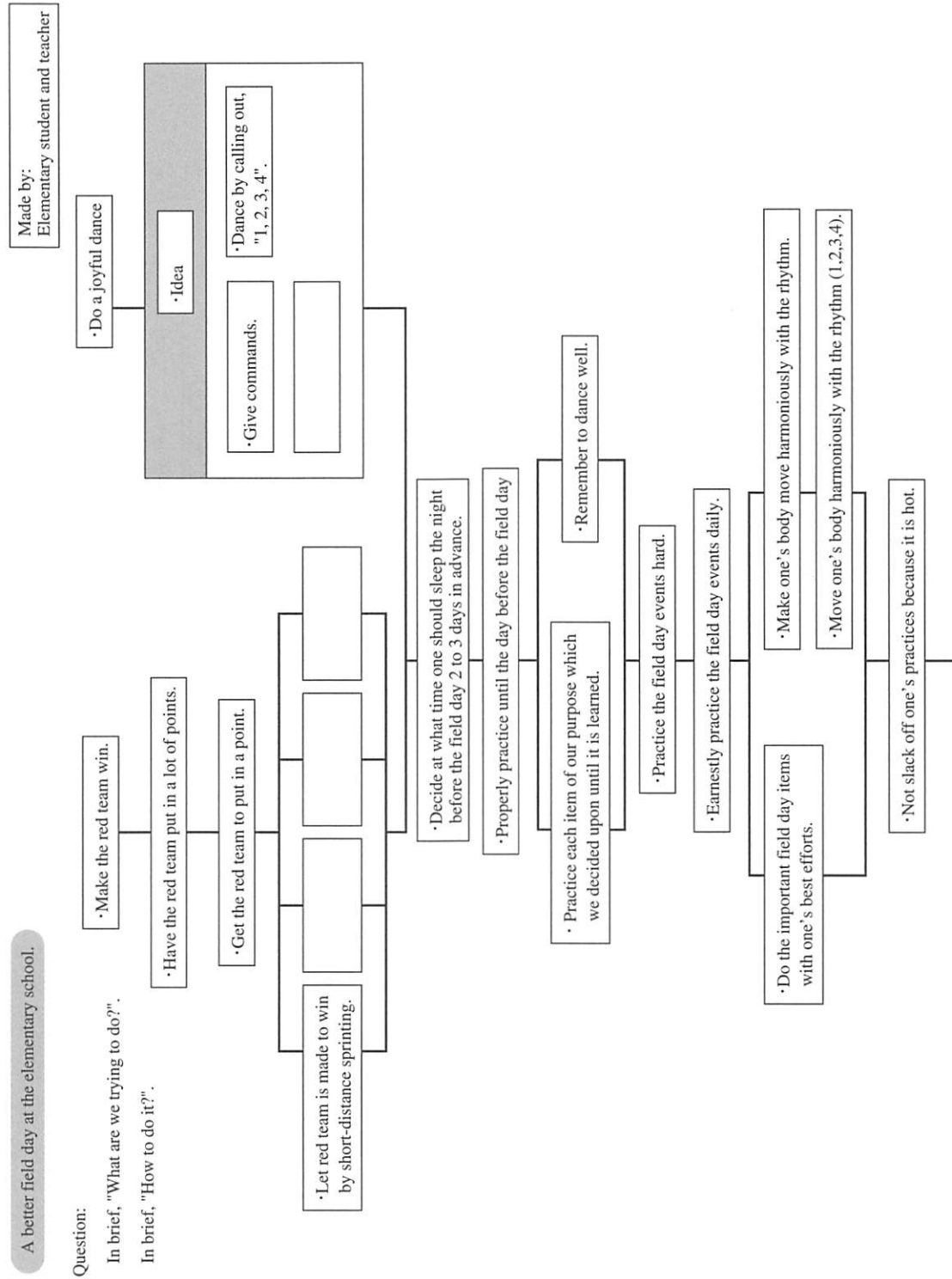
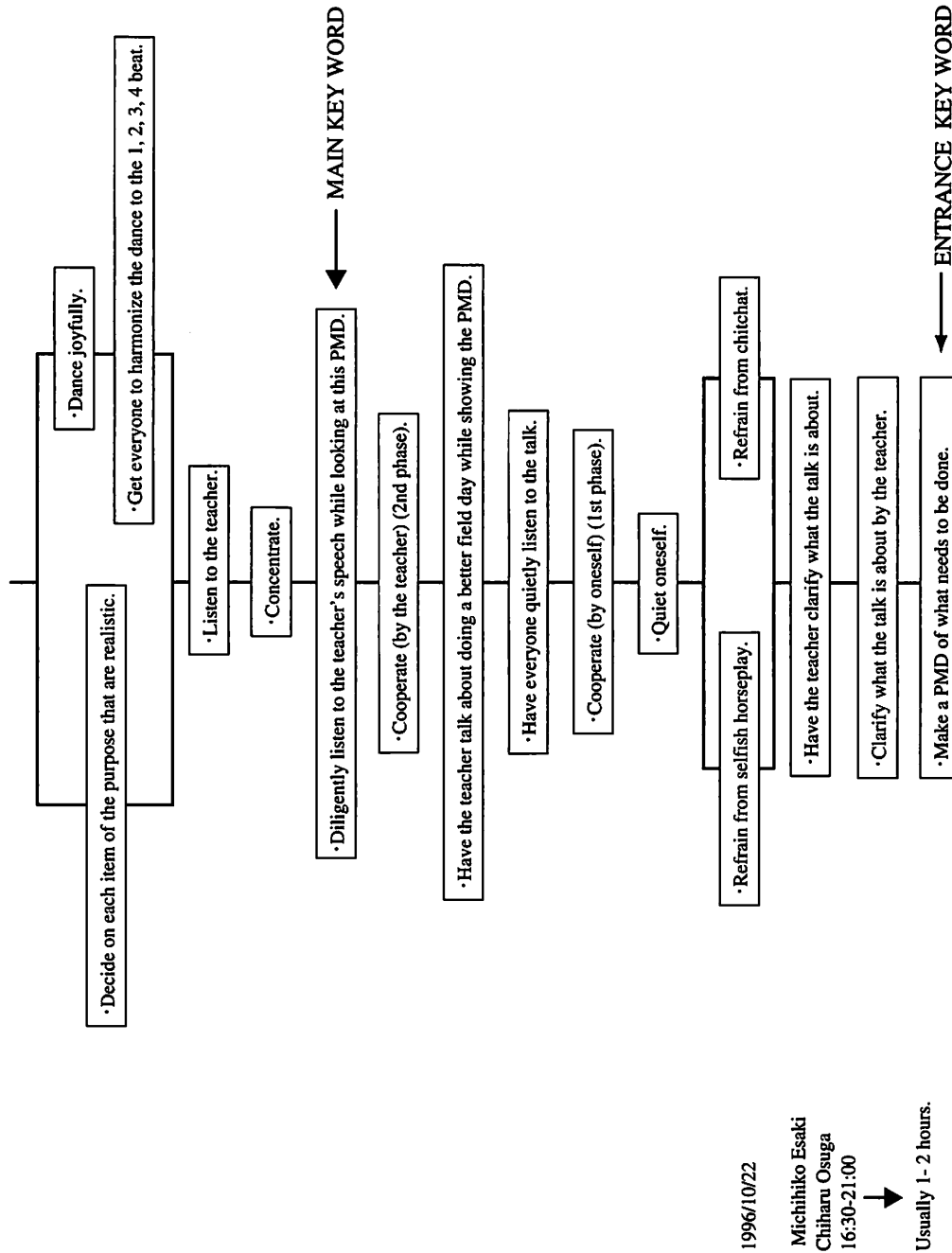


Fig 3-6 Example 1 of a PMD with blank cards





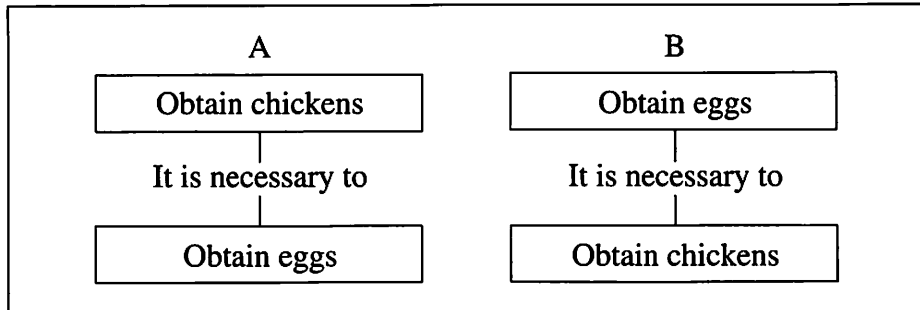
The important things that can be said about this PMD example are:

1. When one is in the midst of making a PMD and one feels that something is missing, put a blank card there. (blank card)
2. To look at the resultant PMD and think what should be written on the card. Then, write the contents on the card.

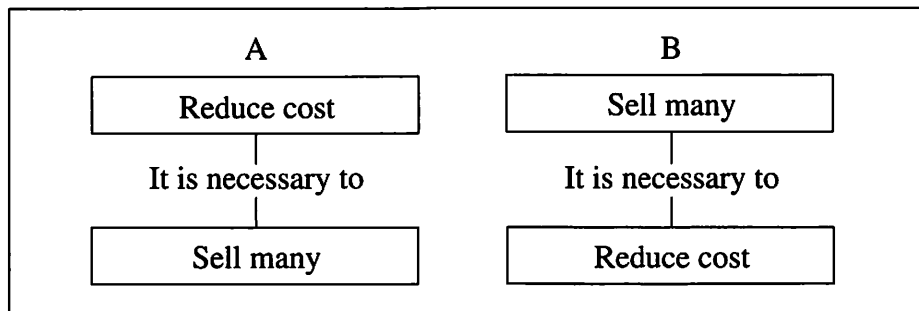
**Fig. 3-7 Example 2 of a PMD that clarifies a vague relationship by comparison**

Let us clarify a vague relationship using PMDs. In comparing A and B, which is more natural ?

(1)



(2)



**【 Explanation of theXT-4 PMD 】 (this example is for professional only)**

Fig. 3-8

This PMD as indicated in (1), was created when a chaotic situation existed initially between the companies in the joint aircraft development since no one knew what to take into consideration when designing the fuel tank's optimal position.

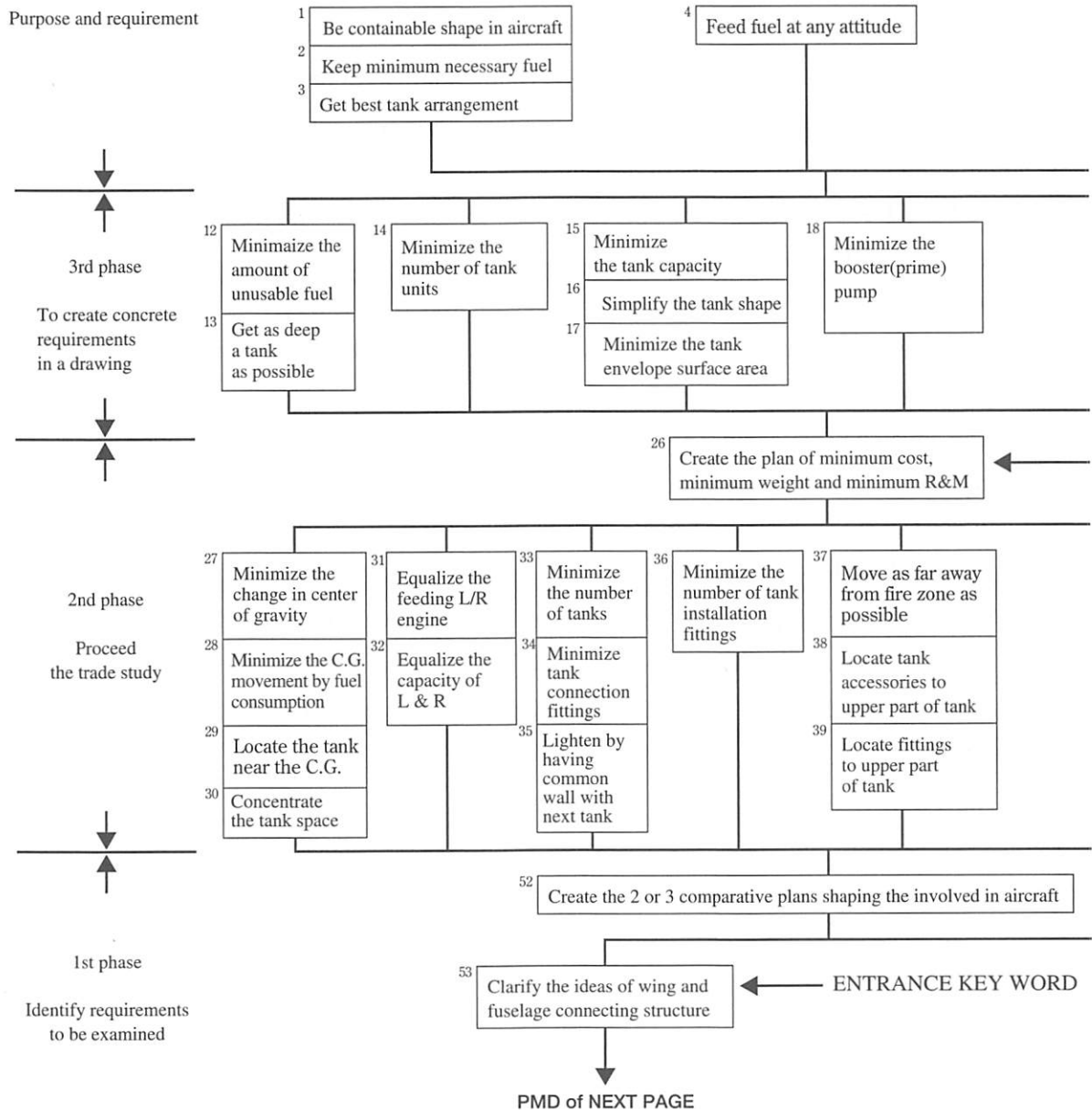
First of all, 10 some odd representatives of the design team from the three major companies mentioned above created this PMD Fig. 3-8 (1) with the theme "Location of the fuel tank". And, according to the ENTRANCE KEY WORD (bottom left side) indicated in the PMD "Clarify the wing-hull combination structure proposal", another PMD was created with the theme "Wing-hull combination system". It is found in the following Fig. 3-8 (2).

The ENTRANCE KEY WORD indicated in this PMD is found at the very bottom of the diagram "Make several feasible proposals concerning the wing-hull plan". That is, a consensus was reached that a comparative evaluation was needed first of the five wing-hull combination proposals for the consideration of the optimal positioning of the fuel tank. Thus, the investigation procedure and its scope for the design were clarified by this PMD. Furthermore, in the initial stages of the development design there were other PMDs made for themes that no one knew where to start and for each theme, determined the scope of the mindset and found solutions for the investigation procedures.

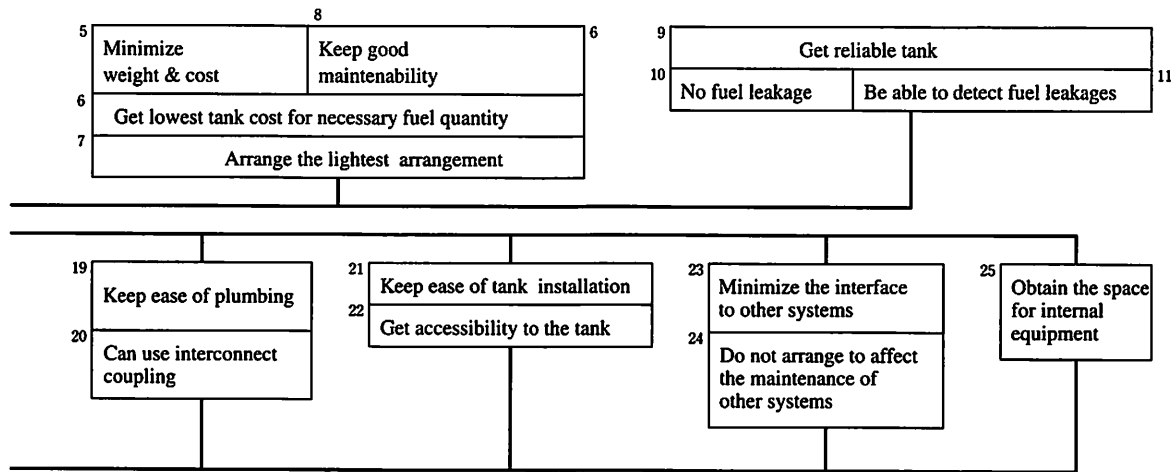
And, in regard to the consensus building for the initial designs, it consequentially became a driving force for the development design and completion of a well-balanced aircraft achieving the purpose values of technology, cost and schedule. (This PMD was the very first one created and so the actual design used the FBS and Steplis faultlessly incorporating the MIL-STD-499c or FAA requirements.)

Fig 3-8(1) PMD theme: Best fuel tank arrangement for XT-4 Training Aircraft

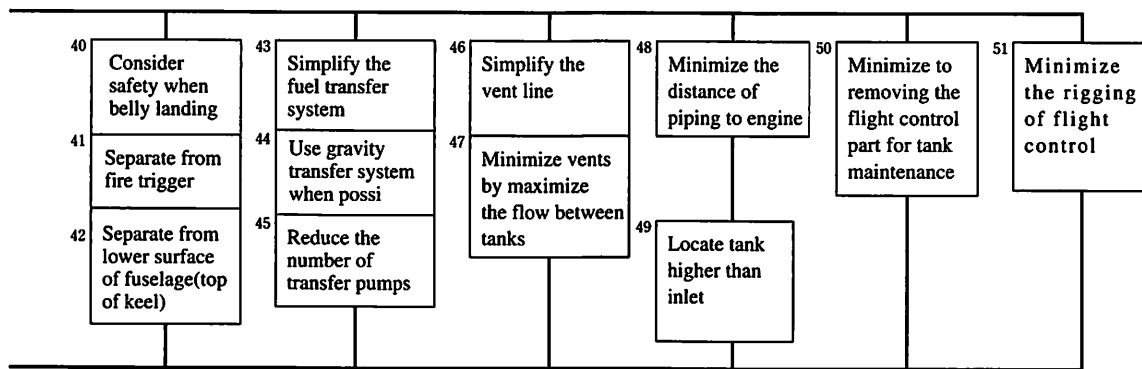
PMD theme:  
Best fuel tank arrangement







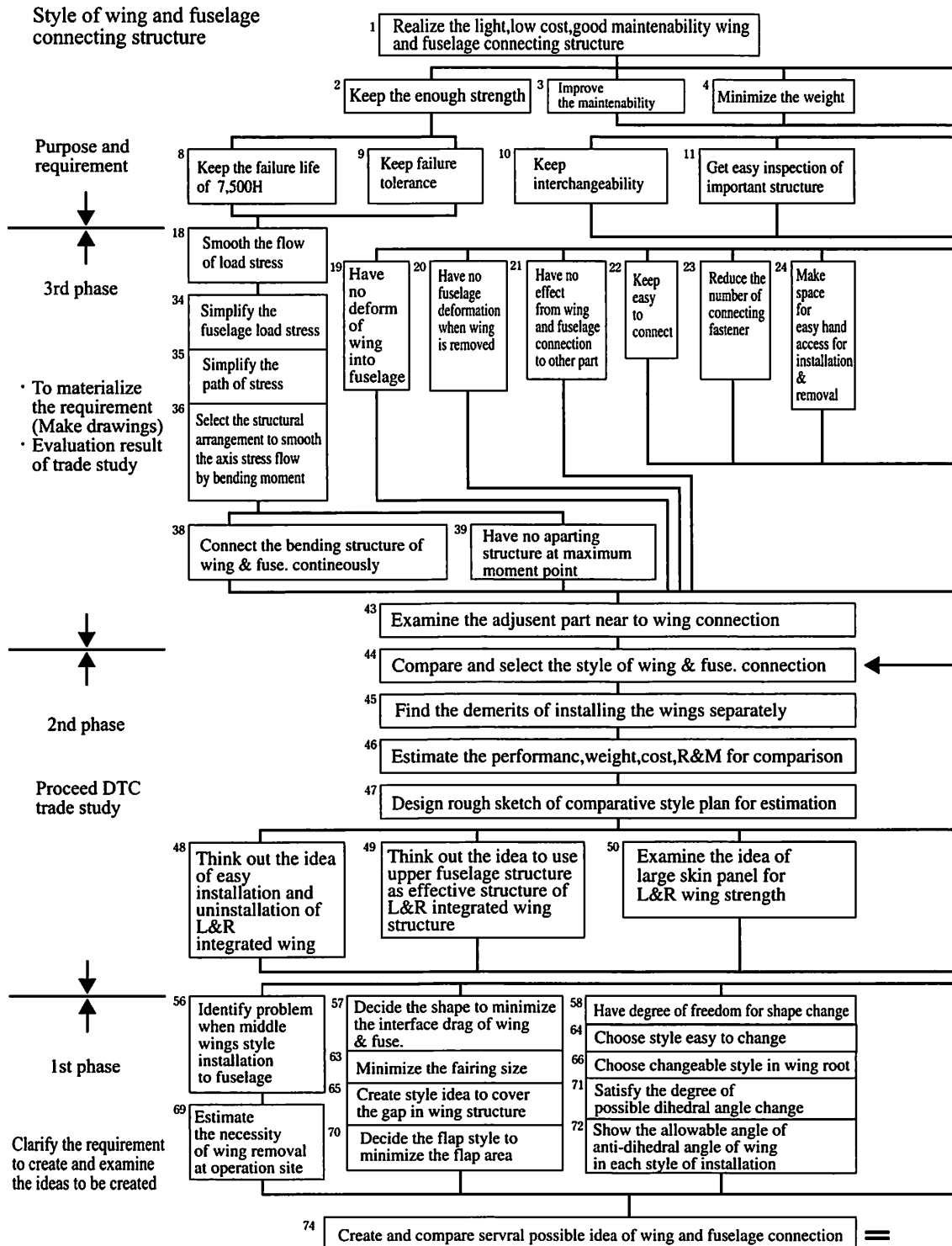
KEY WORD Level 5 trade theme

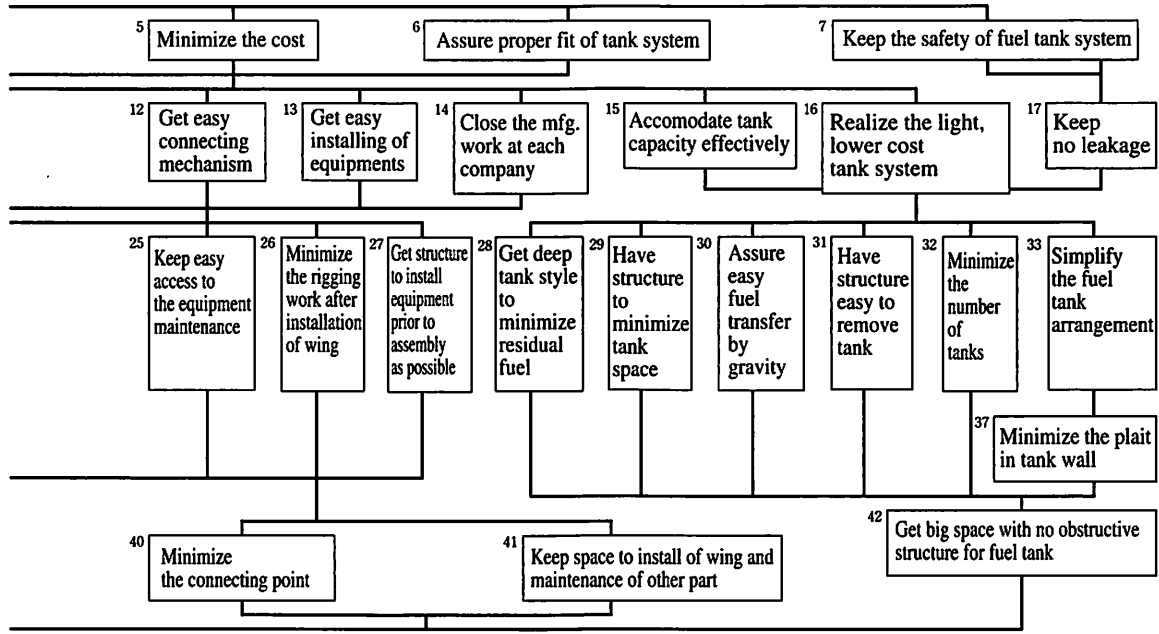


54 Identify the necessary fuel quantity

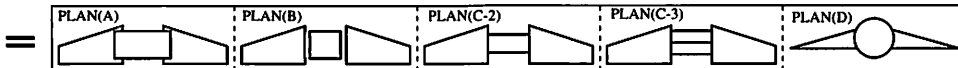
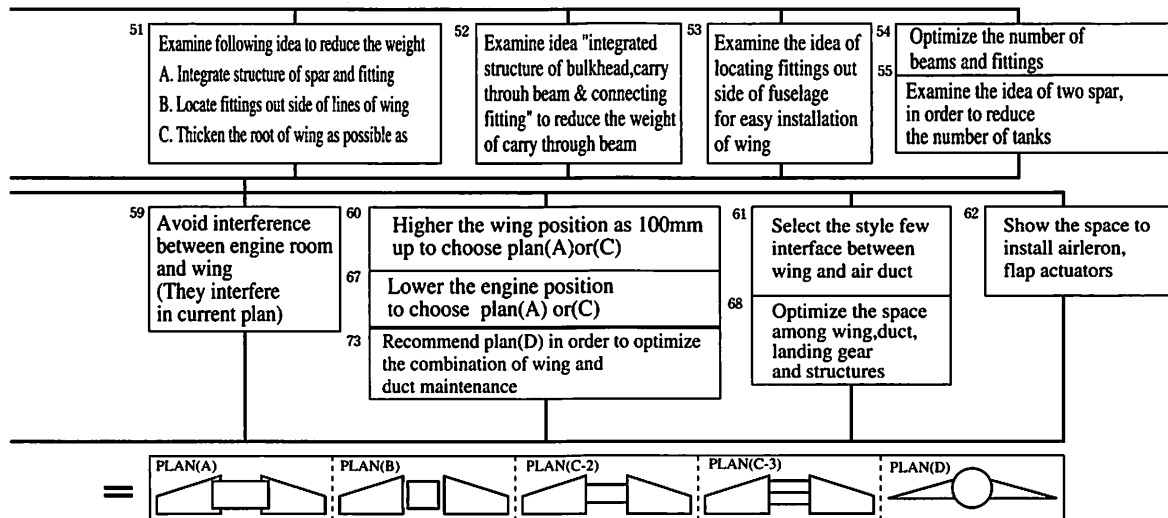
ENTRANCE KEY WORD

**Fig 3-8(2) PMD of Wing and Fuselage connection for XT-4 Training Aircraft**





KEY WORD      Level 5  
Trade theme



## **Chapter 4 The Steplist Method**

### **1.What is a Steplist?**

#### **A step-by-step manual on a single sheet**

As was explained in Chapter 3, when there is a task where no one knows where to start, first create a PMD (Purpose Measure Diagram) to gain direction. However, with just this it is not possible to launch a specific mindset or action to realize the task.

Mindsets and tasks that have no specific action plan will be thought of as an unsubstantiated empty wish and subject to slander. Or, by setting out on intuition or with a rough idea in order to realize the task, there will be oversights, deadlocks or wrong ideas and mistaken procedures. Therefore, to create a mindset that has no pitfalls and actions that are gradually made into a procedure, the Steplist method was designed (details will be given in this chapter).

This method offers a way of escaping chaotic situations when businesses are trying to advance development and mass production and was invented based on the experience of many successful results. One of those experiences and know-how includes working as a coordinator for Kawasaki Aircraft Heavy Industries (presently Kawasaki Heavy Industries, Ltd.) where I established a 'no-shortage' assembly line which was the company's first.

As can be seen from Fig. 4-1 figure, the Steplist is made up of only one sheet. However, with this sheet a completed Steplist makes it possible to realize the task, improve how a chaotic development is progressed and the mindset, actions and procedures which were considered to be hidden in a blackbox are now brought to light with the PMD methodology. Though this may be a single sheet of paper, it becomes a golden sheet for realizing the task. The methods behind it will be discussed one by one, but first let us briefly look at the principle and mechanism of the Steplist.

**Fig 4-1 Steplist Form**

Subject \_\_\_\_\_

Subtitle (KEY WORD) \_\_\_\_\_

Authorized by: \_\_\_\_\_ Date: \_\_\_\_\_

Promotor: \_\_\_\_\_

**Steplist(Phased plan) From A**

	A	B		C		D	E		F	G	H	I
		Step name	Item	Pre-assurance	Item		Post-assurance					
1	1st information collecting (for basic idea creation)											
2	Basic Idea											
3	Breakdown structure											
4	2nd information collecting phase (evaluation of breakdown structure)											
5	Basic matter or basic design											
6	Detail matter or detail design											
7	Implementation or prototype production											
8	Review and corrective action											

## **Principle and mechanism of the Steplist: 4 Faultless Phased Boxes (having no pitfalls)**

### **Principle**

When we take into consideration our thoughts and actions in terms of sequencing, in any situation there is a cause-effect relationship with an input and output, a repeating process and procedure. However, what is inputted is not immediately outputted as the desired answer. What is required are the activities to make the output possible and the assurance conditions to support it. (In this book, this is called the preliminary assurance activities for the output.) The input which meets such requirements is transformed into the output.

A series of thought and actions may come to a conclusion, but whether an effective output was attained with results that can be used as an input in the next phase is uncertain. Thus, preliminary work is needed to verify, evaluate, judge, etc., the output in order to advance it to the next phase. That will be the 'Post Assurance Activities' of the output as indicated in Fig. 4-2. I call such series of cause-effect relationships the "Faultless-4-Framed Boxes". I would like to explain this point by using a concrete example with the theme, "How to cook delicious rice". Refer to Fig. 4-2.

When looking to see what should be entered in each item,

- Input item: rice, water, heat (necessary components to boil rice)
- Preliminary assurance activities for the output: As an activity, there is the rice cooking, and for the assurance conditions there are the degree of heat and time.
- Output item: cooked rice
- The Post assurance activities for the output: As an activity, there is the sampling of the rice for confirmation and for an assurance condition it is necessary to know beforehand the preference of the eater.

Thus, the work procedure and its components for "How to cook delicious rice" are now constructed faultlessly.

### **Mechanism**

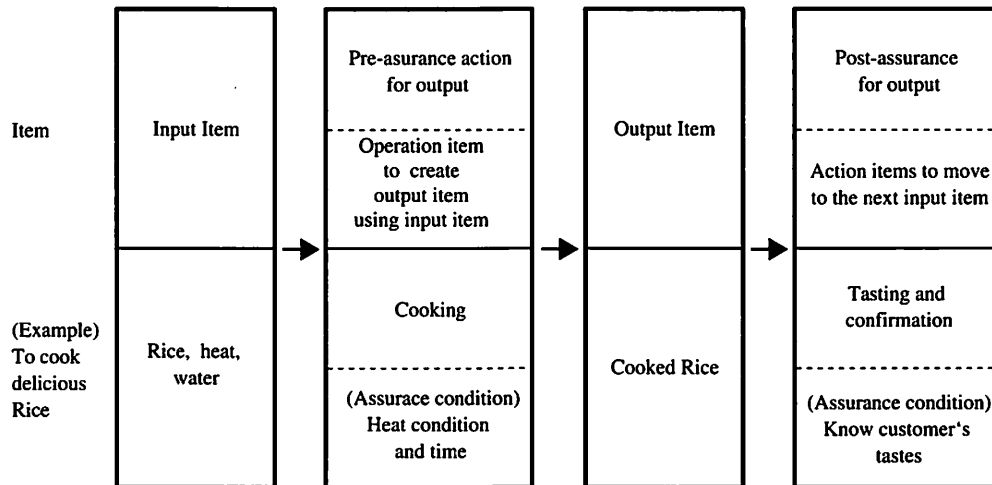
The Steplist can be divided into roughly two phases.

The process/procedure phase that formulates a plan after much thought is called the induction approach phase, and the process/procedure phase that materializes the plan based on the formulation is called the deduction approach phase. And each block is divided into 4 faultless phases (with no pitfalls), with a total structure of 8 phases. This is the fundamental type structure

and when necessary, the number of phases may be increased or decreased. Please refer to diagram 4-3 which is the basic mechanism of that process/procedure.

Summarizing what has been said,

**Fig. 4-2 Causal relationship of faultless Four frame**

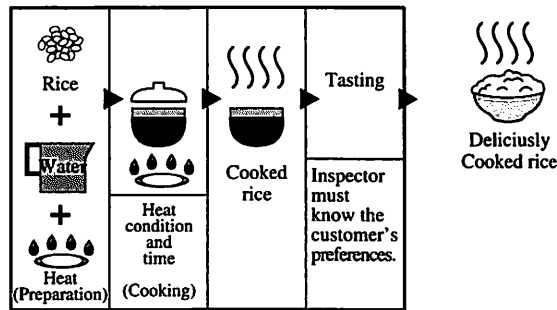


- Top four phases (basic steps 1-4) : They are the phases where after much thought a prospective plan is set up using the induction approach.
- Bottom 4 phases (basic steps 5-8): They are the phases that materializes the plan by executing it using the deduction approach.

Moreover, the vertical and horizontal relationship of the eight phases are:

- Vertical direction: A step-by-step activity divided into a Faultless Phased induction and deduction approach to realize the purpose.
- Horizontal direction: Each cell allocates the components of each phase into a Faultless Phased input and output relationship. Also, when moving from phase 1 to phase 2, a necessary new component is added to the output of phase 1 and made into the input of phase 2. These are the principle and mechanism of the Steplist.

**Fig 4-3 Outline of the Steplist Management Method (Phased procedure manual)**



Input		Output	
Item	Pre-assurance activity	Item	Post-assurance activity
Item	Operation	Item	Confirmation
	Assurance condition		Assurance condition

Form to extract all development stage operation items.(Steplist)

		Phased decision plan							
								Top manager	Date
								Promotional secretary	
		A	B	C	D	E	F	G	
Segment	Basic step	Step content	Input		Output		Other conditions	Who approved the output to the next step and date of record	
			Item	Pre-assurance action	Item	Post-assurance action			
Various thought stage	Inductive approach stage	1 First information collection	→	→	→	→			
		2 Basic idea	→	→	→	→			
		3 Structuring	→	→	→	→			
		4 Second information collection to back up the structuring	→	→	→	→			
Realization stage	Deductive approach stage	5 Base design or basic matter	→	→	→	→			
		6 Detailed design or detailed matter	→	→	→	→			
		7 Prototype or implementation	→	→	●	→			
		8 Review and correction	→	→	→	→			

Put the name of the goal gained from the key word expression and create a procedure linked with the input in step 1.



## **2.What can be done with the Steplist**

Just by looking at the Steplist sheet, I believe one would have a hard time trying to understand how to utilize it and how to make it. First of all, let us see what can the Steplist do.

### **1. The Steplist becomes a manual that drops the task theme into the now concrete mindset and activity procedures after receiving direction from the PMD.**

By creating a PMD, the MAIN KEY WORD and ENTRANCE KEY WORD emerged which allows one to achieve the task, and also a rough procedure came into view as discussed in the previous chapter. However, in the case of a complex task, a more detailed Faultless Phased manual is needed. The Steplist plays this role. In other words, by combining the Steplist with the PMD, it is possible to create a mindset and action procedure in order to realize the task in chaos. Therefore, if it is not possible to create a Steplist for a certain task, then since it does not have a procedure it will be judged to fail.

### **2. It is also possible to use it for review, evaluation and improvement of the work procedures done up to now.**

Thus, the Steplist is very useful for not only new themes, but for present ones too. This is because it can change a blank sheet into a tool to review work.

### **3. In regard to the joint venture between Kawasaki Heavy Industries and the Defense Agency back in 1972, by creating a Steplist I was able to see the pitfalls in the project and bring the years of it being in the red into the black box.**

It can perceive the collaboration do activity between Defence Technology Headquarters and Kawasaki Heavy Industries, it comes off, and there is a step of the procedure for failing by the creation of the Steplist and is Takara. By creating a Steplist, I was able to perceive that a step in the procedure was missing in the collaboration between the Defence Technology Headquarters and Kawasaki Heavy Industries. The details to the sequence of events leading to the design of the Steplist will be discussed later.

### **4. Depending upon which side says it first, it is possible to create a mechanism where the discussions will become favorable or unfavorable.**

In regard to this point, please refer to the "Offer and Acceptance" column found at the end of this chapter. As to why this kind of effectiveness can be expected, the Steplist includes a message or clause with the following effect.

(1) As already mentioned, the phased procedure of the Steplist has roughly 2 phases.

With the risk of being repetitious, one phase is 'After much thought a prospective plan is set up using an induction approach.' and the other is 'The phase that materializes the plan by executing it using a tactical deduction approach.'. Therefore, if the Steplist format is utilized the relationship of these strategies and tactics can be logically organized (Note: The meaning of induction and deduction that are stated here are different from what is defined by Charles Sanders Peirce from the studies of Logic.).

(2) When trying to proceed with something, the PMD configures the 1st evaluation criteria from the 'direction of value' viewpoint and the Steplist constructs the 2nd evaluation criteria. What this means is that when moving from one phase to another, an evaluation and judgment are conducted to see if it may enter the next phase. Therefore, if the output of the previous phase does not satisfy the logical evaluation and judgment, it cannot advance to the input of the next phase. Then, the evaluation criteria will need to be established.

Although I have never found a guideline or thesis that reveals "What needs to be done in an evaluation?" this methodology can fill in the gap. The 4 boxes of each phase in the Steplist are where the 2nd criteria is located.

(3) The word "inspection" has 2 meanings, "VERIFICATION" and "VALIDATION". When inspecting the Steplist from the input side to the output side direction it becomes "VERIFICATION" and from the final output side (or end side) to the input side direction "VALIDATION". In other words, VERIFICATION is to see if something can be made as designed, and VALIDATION is to see if something has practical use.

(4) The Steplist allows the task and its extracted conditions to become faultless by extracting the components of the cause-effect relationship and its conditions to become a faultless procedure using the principle of the 4 boxes mentioned above. Therefore, it becomes possible to make a Faultless Phased project management procedure.

(5) When the format is completed, by viewing in the opposite direction, from the output to input, a faultless scenario can be made beforehand showing the net result. For instance, by using the process for making a Steplist one can notice what is lacking or what should be added to the procedure (according to management) by viewing from both the input side to output side and vice versa. (Input to output is VERIFICATION and from final output (end side) to input is VALIDATION.)

Because such an effect exists, what has been called the "Black Box" in collaboration activities (especially in joint development) can be acquired (by less innovative individuals or companies) and one would be able to imagine in a step-by-step fashion what decision making / judgment are needed.

※ ※ ※

I have already mentioned that a project that was long in the red was put in the black by creating a Steplist. What I haven't filled in was that although a prototype "Steplist for reasonable purchase price" had already been made at that time, it had never been put to use until that experience. Next, I will explain the details.

**【The Steplist that saved a development burdened with a yearly deficit and progressing unsatisfactorily】**

The opportunity to design, implement and obtain results for the Steplist came from the development of the antitank guided missile that was joint-developed by Kawasaki Heavy Industries and the Defense Agency.

Although this strategic project was to be a development spanning over several years, it had a large annual deficit and the management was worried since the countermeasures taken were not working as expected. Then, I was given a command to do something about it and with a newly formed task team, I set out to find a solution.

The cause of the deficit was because although orders were received, for some reason the sales were also in the red. Thus, I found the proper price for the development project and received orders reflecting it.

Next, I created a Steplist with the task of how to progress the development in hope of gaining some clues to finding a solution. I tried to find a clue to the problem in a state of chaos. First, I created the Steplist for the Reasonable Purchase Price and from my experience in finding a clue to the complicated multiform order placing problem to the subcontractor, I thought that if it could also be applied here, then the traffic regarding the task could be organized.

Then, on a large blank sheet of paper I made 4 columns for "The component relationship included in an ideal project". That is, for each item "Input ", "Preliminary Assurance Activities for the output", "Output" and "Post Assurance Activities to evaluate/judge if the output could be used in the next phase" I made a Steplist with each of the components included.

I then deployed it on paper so that the sales and technology departments could see visually if the phased process activities that they were conducting were faultless. After checking the whole activity, the following results became clear. That is, in regard to new equipment that were to be developed, Kawasaki Heavy Ind. was supporting the Defense Agency's budget application, however, every year in mid-January if the Defence Agency does not issue a directive to continue the project even though the sales and engineering departments of Kawasaki Heavy Ind. and the Defence Technology Headquarters were in the midst of development, the process and procedure of the project would not go in the desired direction.

Then, it became clear to the sales and engineering department of Kawasaki Heavy Industries and even to me, although I had no prior experience in sales, that some form of technological backing had to be given to the Defence Agency.

Then, I immediately called the sales manager and went to the Defense Agency Technology headquarters to ask if they could find out whether such a notice was to be found within the Defence Agency. The next day we received word that there was such a notice and that the sales department had overlooked it up to now. I then received word from the sales department that they had overlook that up to now.

Thus, the Steplist led to a phased procedure of an appropriate, Faultless Phased development. Here, I realized that there was a feature within the Steplist procedure to search for a pitfall in the cause-effect relationship. The Steplist became the ultimate weapon because it was possible to check if there was a pitfall in the procedure.

Recently, a certain software company has mentioned that by first using the Steplist and then the FBS method which describes things in detail, the 'black box' activities of the sales department has become clear and that precise actions can now be taken.

### 3. Creation of the Steplist

#### PMD and Steplist

From the above, I'm sure that it has become clear that by creating a Steplist, complex tasks where the starting point could not be seen or dealing with one that is the most complicated up to now, a scenario can be attained to realize the task.

Now, I would like to explain how to create a Steplist using an exercise. Though there are countless of actual examples of Steplists made by companies, each case would reveal the secrets of corporations and so I would like to make one based on the experience of an acquaintance whose younger brother had determined to construct and manage an apartment building.

This younger brother, who out of the desire to make a stable form of income for the future, felt uneasy whether the location of the land that he had was suitable for an apartment, and if the funds he lacked could be covered by a loan. Also, this brother who lacked construction knowledge was worried that he would be taken advantage of by the construction companies.

First of all, to check the validity of this plan, a PMD (Purpose Measure Diagram) was created. Then, a Steplist was made according to the PMD. The resulting PMD and Steplist were Fig. 4-4 'Construction and Management of the Apartment' and Fig. 4-5, respectively. This Steplist allowed for a smooth construction process and management of the apartment building. After seeing the Steplist used for planning the apartment, the construction company had even began using it to make its sales activities into a procedure.

#### Creating a Steplist

I would now like to give the details of how the Steplist of the 'Construction and Management of an Apartment' was created.

##### Creation Process

**Procedure 1:** Understand what the MAIN KEY WORD and ENTRANCE KEY WORD are by making a PMD. The PMD for the theme 'Construction and Management of an Apartment' is found in Diagram 4-4 and it was created by first learning the method in Chapter 1 where "How to do it"(verb and object) were brainstormed and then arranged according to a purpose and measure

relationship.

From this, it was found that the **MAIN KEY WORD** was **Construct and Manage an apartment**, and the **ENTRANCE KEY WORD** was **investigated in order to plan how to proceed**.

After understanding what the **MAIN KEY WORD** and **ENTRANCE KEY WORD** are, it is finally time to create a Steplist.

## **Procedure 2: Filling in the Steplist**

Look at the Steplist of Fig. 4-6. I will explain using this Steplist.

1. First of all, write in a suitable 'Output item name' (noun) according to the **MAIN KEY WORD** of column 7D. In this Steplist, the key point is the output 'Rent (income) from the moving-in completion', etc.

2. Next, write the necessary input component for the output of row 1, column 1B.

In the Steplist, the items "Candidate land" and "Available funds" are included.

3. The final target is indicated by 1 and according to 2, the means will be written in.

Therefore, the next activity will be to use 2 to know how to lay out the phases (processes) in order to achieve the final target of 1. That is, the phased output items (from phases 1 - 6), which are considered necessary to achieve the purpose indicated in 7D are extracted and considered, and then laid out and entered in phases 1 to 6.

In column 1D of the diagram, 6 items such as 'Dimensional drawings of the geographical features', 'Trends in apartment demand of the region', etc., were entered. In column 2D, the 'Floor plans', etc., are written and one by one they are entered in column 6D. Thus, the procedure components (noun) for accomplishing the object are entered in the output column. Next,

4. Regarding the output items of each phase such as 'Input item name (noun)', 'Preliminary assurance activities', 'Output item name (noun)' and 'Post assurance activities', they are written so that a cause-effect relationship exists. However, the 'Post assurance activities' must hold a cause-effect relationship linking it to the next phase. If you view the diagram's 'Input item', 'Preliminary assurance activities' and 'Post assurance activities', you will notice that each has a cause-effect relationship to the output item.

**[note]**

When proceeding with this activity, if the 'Output item name' is inappropriate with respect to the cause-effect relationship, amending, moving, adding and if necessary increasing the number of phases are done.

5. The completed Steplist is again reviewed and if necessary the items are increased, expressions changed and their sequence linking each other are confirmed for appropriateness.

Then, from an overall perspective it is adjusted and the Steplist is completed.

**Writing method**

1. A process where 4 boxes linked by a faultless phased relation is made by writing a noun indicating the procedure component in the input/output components, a noun indicating the action such as '.... creation' in the preliminary assurance component and the noun 'approved' in the post assurance column.
2. Generally, there are 8 rows and columns from A to I, below is an example with columns from A to F. 'A' column/step contents: after columns B, C, D and E are filled in, write the most appropriate phase name.

**Input item**

B column/ item: in order to create the D clause, the necessary materials and item name (material name, clause name, etc.) are written. C column/ preliminary assurance activities: using the materials in B column on the left, write an activity item name which will make things in the D column on the right.

**Output item**

D column/ item: Write the noun (name of things) that indicates 'What'. Also, when writing the phased processes, one would advance downward. In order to have the D column item be used in column B of the next phase (such as from the first phase to the second), it is necessary to examine, allow/approve and to write the necessary activity item name.

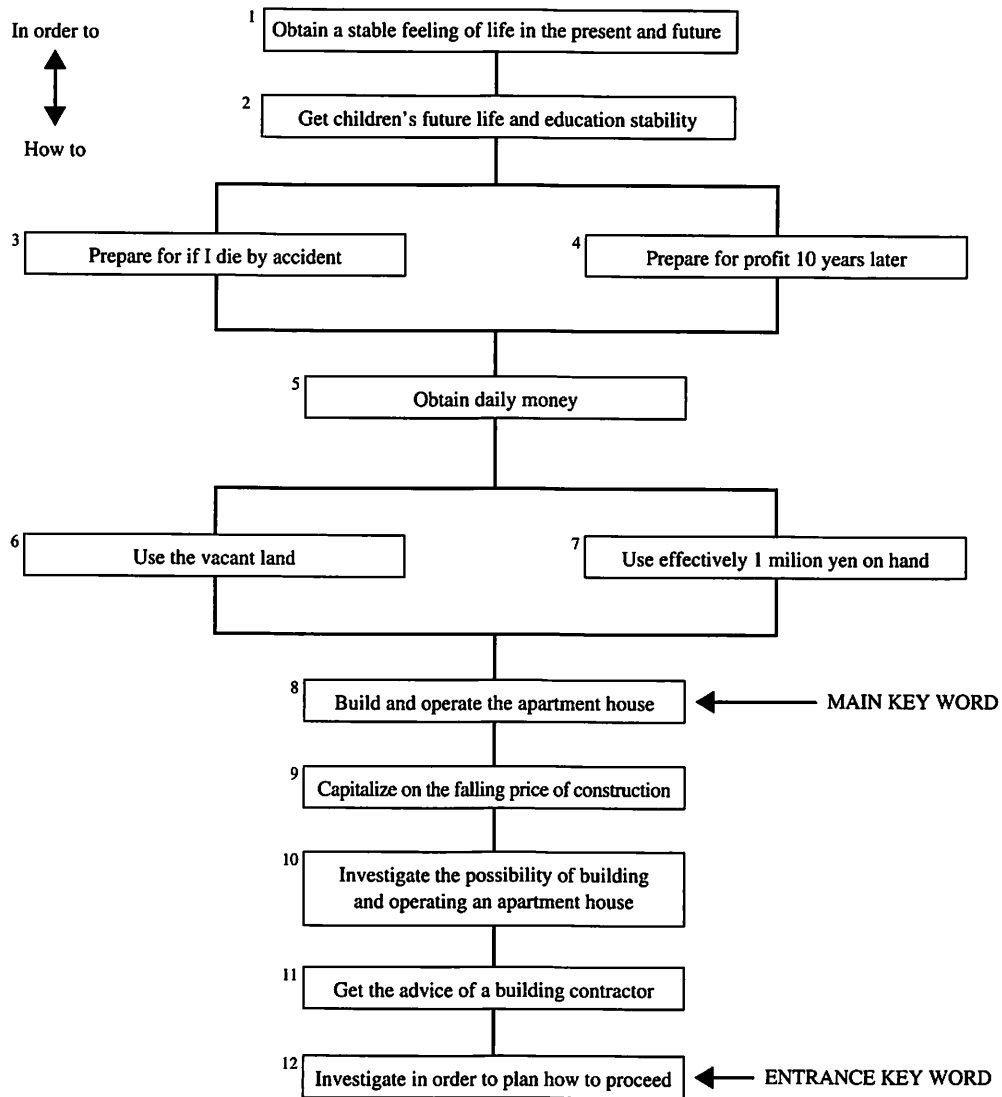
F column and other conditions: The remarks and other conditions that could not be written in columns B, C, D and E of are entered here according to each row. The resultant diagrams made according to the above procedures are Diagrams 4 to 6.

3. It is not necessary to use the exact expressions from the PMD in this Steplist.
4. In the case where the clues for the procedure still eludes you, it can be resolved using Post-it to write all procedure component items that can be thought of and sticking them at the appropriate locations in the Steplist.

After going through such processes, the Steplist will finally be completed.



**Fig 4-4 PMD for building and managing an apartment house**



**Fig 4-5 Example of steplist management**

Subject: Construction and management of apartment house

Sub-title: To construct and run an apartment house

## Steplist

		A	B	C	D
		Step title	Input		Output
			Items	Pre-assurance activity	Items
1	1st information collection	Make preparations as the owner	1.A site proposed(O) 2.Funds on hand(O)	1.Survey the land.(o) 2.Ask for the opinion of the real estate agency on the site(o) 3.Look into construction companies (o) 4.Study by construction magazine, book etc.(o) (Unit price of construction)	1.Topographical & dimensional map 2.Demand for apartment house in the area (o) 3.Requirements and specification plan to be estimated(o) 4.Listing of possible of builders(o) 5.Rough estimate of capital required (Max & Min)
2	Basic idea	Basic plan and rough estimation	1.Topographical & dimensional map 2.Demand for apartment 3.Requirements and specification to be estimated 4. Listing of builders 5. Rough estimate of capital required (Max & Min)	Outline of design (o,v)	1.Ground plan(two or three plans from each builder)(v) 2.Rough estimate (more than 2-3 plans)
3	Break down structure	Estimate	1.Ground plans (2-3 plans sent) (v) 2.Rough estimate (2-3 plans selected) (v)	1.Basic design work(v) 2.Previous arrangement for the terms of estimation(o,v) 3.Preparation of estimate (v)	1.Detailed plan(2-3plans)(v) 2.Finishing table schedule 3.Vertical view of section(v) 4.Estimate(v)
4	2nd Information collection	Contract	1.Select single detailed plan & estimate (v,o) 2.Rough estimate (2-3 plans selected) (v)	1.Negotiations(o,v) 2.Applications for construction & received of approval(v) 3.Previous arrangement for the preparation of contract(o,v) 4.Raising of funds with a loan,etc. (o)	1.Contract(draft) for awarding construction work(v,o) 2.General schedule(v,o)
5	Basic matter (Basic design)	Final approved plan	1.Contract for awarding construction work. (o,v) 2.General schedule (v) 3.Detailed requirements (v)	1.Confirmation of matters guaranteed(v,o) 2.Previous arrangement for work detail(v,o)	1.Final approved plan (Including detailed design) (v,o) 2.Detailed work schedule (v,o)
6	Detailed matter (Detailed design)	Completion of apartment house	1.Final approved plan.(v) 2.Detail work plan.(v) 3.Matters to be discussed in the course of work (v,o)	1.Construction work (v) 2. Inspection work in each process 3. Detailed arrangements in each phase	1.Completion of apartment house (v)
7	Implementation	Maintenance	1.Completed apartment house.(o) 2.Terms and conditions to the renters(o)	1. Start admission process of residents(A) 2. Instructions for residents(O,A) 3.Talk with real estate agency regarding administration(O,A) 4.Establishment of how to pay house rent(O,A) 5.Contract with residents and admission(O,A)	1.Income from house rent due to complete admission of residents 2.Result of inspection on the defective parts of the apartment house.
8	Review	Income from rent	1.Income from rent 2.Result of inspection of the defective parts of the apartment house	1.Return of dept 2.Decision of whether or not the defective parts can be repaired or replaced	1.Report for taxes. 2.Appropriately maintained apartment house.

## (Phased plan)

(o):owner  
(v):vendor  
(A):real estate agent

Authorized by: \_\_\_\_\_ Date \_\_\_\_\_  
Promoter \_\_\_\_\_

E	F	G	H	I
Output	Other conditions	Decision level & schedule	Attendants at output briefing	Actual decision date & notes
Post-assurance activity				
Checking of possibility of raising funds (Bank housing financing corp,etc.)		Authorized by owners on Dec.1		
Compare estimates(o)	1.In case of comparing estimates not necessary to show builder an estimate of funds required 2.As for ground plan, it is a must to have 2 or 3 plans and proceed to the next step of estimate	Jan.15		
1.Check by management plan check list (1)Possible rent (2)Managing efficiency (3)Borrow & return plan of building funds. 2.Contractor under consideration		Feb.5	Building contractor	
Payment for starting construction work	Date expected for approval Mar.15 is contract date with confirmation of terms for obtaining construction certification Mar.30 is the contract date to complete the above.	1.Owner 2.Building contractor responsible for the work Mar.30(Mar15)	Building constructor (1)Sales Sec.person (2) Superior for the work. (3) Sub-contractor	
1. Lay baseline on ground (o,v) 2.Check day's detail work plan (o,v) 3.Confirm matters to be managed (o,v)		Mar.30	Building constructor Person in charge of design	
1. General inspection before renting to residents (O, A) 2. Inspection and repair of defective places (o, v)		At the end of May		Building contractor
1.Confirmation of results of inspection on the defective areas of the apartment house 2.To the 2nd resident and repairs should be cleared (A,O)	1.Check defective areas of apartment in accordance with checklist 2.The measures to solve problems of 2 items written on the left is to be examined case by case.	Owner As necessary	1.Resident 2.Real estimate agency	
1.Manage so that there are no vacancies(O,A)		Owner As necessary	1.Resident 2.Real estimate agency	

**Fig 4-6 How to fill the Steplst**

As shown below, entries are labelled in order ①②③④ and so on, and the procedures are created.

Where the "○" mark appears, the "Output item" of the previous stage and the new item are entered.

Subtitle (Keyword) Enter the "Task or theme name" here.

Authorized by: \_\_\_\_\_ Date: Enter the "above-mentioned main key word" here.

The name of the highest ranking person in charge of this project is written.

"Name of the person in charge of the overseeing office" is written here.

Authorized by: \_\_\_\_\_ Date: \_\_\_\_\_

Overseer of the Plan Particulars: \_\_\_\_\_

		A	B	C	D	E	F	G	H	I
		Step title	Input		Output		Other conditions	Output Approved by and expected completion date	Output Approved by and expected completion date	Actual output approved date and remarks
		Item	Pre-assurance Activity	Item	Post-assurance Activity					
1	1st information collecting phase	②			④					
2	Basic Idea	○			④					
3	Breakdown structure (Structuring)	○			⑤					
4	2nd information collecting phase	○			⑥					
5	Basic matter or basic design	○			⑦					
6	Detailed matter or detail design	○			⑧					
7	Implementation get subjective result	○			⑨					
8	Review	○			⑩					

The necessary materials, item names (name of things) to make paragraph D is entered here.

The necessary approval, acknowledgement and task item's name are entered here in order to be able to utilize the item from Row D in Row B in the next stage.

In this column, the notes and conditions that could not fit in each row of columns BCDE are written here.

The task term (name of the task) to make the right side (pertaining to row D) is written here using the raw materials in the left side (B column).

The name of things, a noun (names of things) that indicates "What" is entered here. (Note) The phased process progresses in the bottom direction.

#### **4. Case example of creating a Steplist**

We have seen how to make a Steplist based on an actual case example. Now, let us look at how an actual Steplist was made.

##### **Case 1**

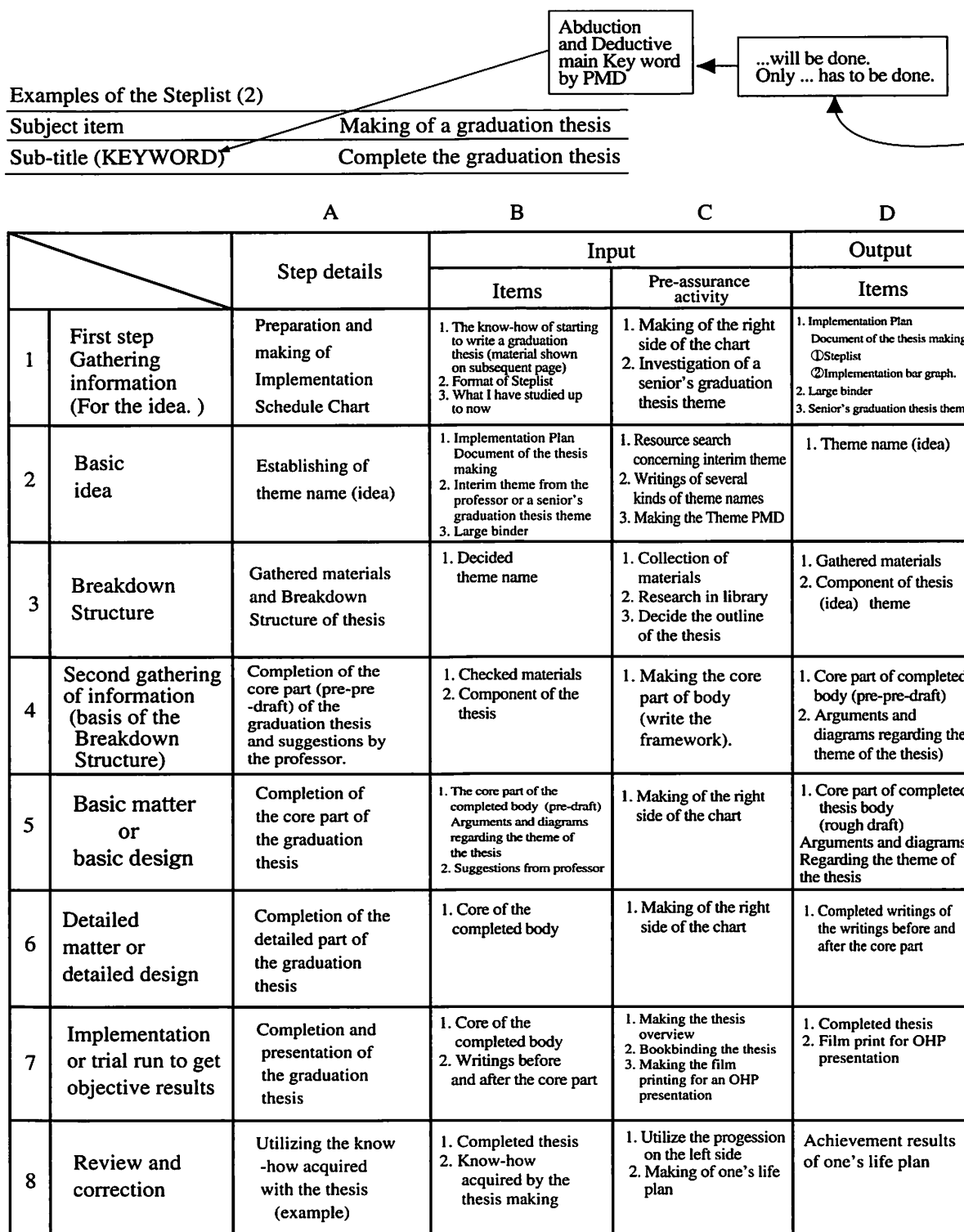
Case 1 : The Steplist that was made by myself and a student while I was working as a professor.

Subject: Creation of a graduation thesis

MAIN KEY WORD: 'Complete the graduation thesis' .

Diagram 4 to 7 is the Steplist that was made. Although the subject, task and MAIN KEY WORD may be the same, the completed Steplist is not necessarily the same. There is a difference based on the person who makes it. However, if the target is the same in the task realization and the Steplist is made according to the same MAIN KEY WORD, then each item will resemble closely no matter who creates it. Try making the Steplist from case 1 by yourself.

**Fig 4-7 Steplist for 'Complete the graduation thesis and make one's life plans'**



A rough outline of "Only ... has to be done. If ... is done, it may be possible to do." Can be attained when the purpose and means relationship of the PMD is linked.

The expression of "Abduction" is made with the Main Key Word expression that was grasped with the PMD.

Plan approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Overseer of the Plan Particulars: \_\_\_\_\_

E	F	G	H	I
Output	Other conditions	Output Approved by and expected completion date	Output Briefing attendees	Actual output Acknowledgment date and remarks
Post-assurance activity				
1. Discussion with the professor ①Receive interim theme from the professor. ②Consult with professor after deciding rough topic	Adjustment in the schedule step that coexists with one's part-time job	Professor		
1. Acknowledgement of theme	Regarding the theme name, adjustment may be made when one feels that an adjustment is needed during the theme writing.	Professor	Verification for the future It can be accomplished if .... is done. It is acceptable if the outcome is ....	
1. Explain to the professor and receive suggestions	1. Preparation of a personal computer for the thesis	Professor	Is this acceptable? Is that acceptable? Is it OK?	
1. Explanations to professor 2. Obtain suggestions from the professor		Professor	Evaluation in the future	
1. Get the professor's acknowledgment	1. From this moment on, the actual entry task into the computer is conducted. 2. Use software for writings, table calculations, and drawing diagrams.	Professor	Decision making If this line (the line that moves from phase 4 to phase 5) is crossed, Full Decision Making has been done. That is, if the work or arrangements are started over again, severe damage would occur.	
1. Adjust. according to read-through with other thesis team		Professor		
1. Presentation of thesis 2. Graduation		Classmates Professor		
One's satisfaction	1. When one's life plan is drawn, report it to the professor. 2. Putting it on the alumni bulletin is one idea.	Classmates Professor		

Inductive phase

Deduction phase

Inductive phase (Materialization)

## Case 2

The Steplist shown in Fig. 4-8, was made by myself for the entire development of the XT-4 training aircraft between Kawasaki Heavy Industries and the Defence Agency. It was first published with the consent of the Defence Agency in the Aerospace Engineering Handbook in 1992 and then in the third edition in 2005.

The purpose for the publication was to show a case example of the mindset and procedure explanation for the management of an actual development plan in regard to civilian goods, commercial aircrafts, military aircrafts, missiles and space equipment systems (including software). Although the specific example is of an aircraft, the mechanism for managing the development of civilian goods have exactly same pattern, and so this can become a multi-purpose reference.

In this chapter of the Development Plan, the theme of the Steplist, that is, based on the integrated management (including phased quality control) of the performance, cost, schedule, reliability and logistical support, including up to the growth system management plan after completion of the product system, is included.

Main item: Development of a medium training aircraft (including Design to Cost).

MAIN KEY WORD: 'Develop an economical medium-sized training aircraft'

In addition, Diagram 4-9 indicates how the fundamental Steplist and the actual Steplist are related. Fig. 4-8 is to be used as a reference to see how the fundamental type actually changes. Fig. 4-8 is the Steplist of the entire development of the medium-sized training aircraft for the Defense Agency (including DTC). The lower layer of this steplist example are shown in URL below

<http://dtn-wisdom.jp/E-edition%201/04-03-Chap%203%20R7-LayeredStepl.pdf>

Fig. 4-9 describes the relationship of the fundamental and actual Steplists: an episode of the Offer and Acceptance relationship.



### Case 3

#### Reasonable Purchase Price

The Steplist of this reasonable purchase price was a theme that had become the starting point in constructing the mindset and procedure (methodology) stated in this book. There still has not been an appropriate reasonable principle nor methodology established for the Reasonable Purchase Price from 1972 to the present. From the supplier and seller's side, it is a continual bargaining from the beginning to the end of the deal in order to make a profit. Also, in government and megaprojects there may be a third party involved hiding secretly behind a thick veil. One of the main themes operating in my work is to construct a mechanism that is specific and immediately executable in order to make problems concerning the purchase price reasonable and transparent.

However, since this chapter cannot state all the details, I am soon planning to publish a book explaining the specific points of this issue under the title, "How to decide on a reasonable purchase price (tentative title)". Incidentally, when you indicate the contents and article,

- ① Mindset of proper purchase price
- ② Reasonable mindset that deals with reasonable change in purchase price
- ③ Specific Steplist of proper purchase price in order to do that
- ④ Descriptions of the basic contract document that supports the fair price Steplist.

A specific case example of the PMD and Steplist is given in case 3 of the Reasonable Purchase Price Steplist. First of all,

1. When the PMD (diagram of the purpose and means) of the proper purchase price is constructed, it will appear similar to diagram 4-10. As can be seen from the diagram, the reasonable purchase price is not a concept where the purchaser and supplier conflict. That is, as indicated in the diagram where both parties have a common objective, in order to achieve (to create a clientele, and satisfy the clientele), it is clear that there is a need to supply the clientele with (a valuable item or system with a price that is as low as possible). In order to achieve this, it can be understood that the manufacturer will be requested to procure the needed items with a reasonable purchase price effectively and efficiently, while the component supplier will be requested to supply the required items with a proper supply price effectively and efficiently. To bridge these two sides, the reasonable purchase price Steplist (Fig. 4-11) is needed.

**Fig 4-8 Steplist of DTC for military aircraft, Aircraft system, total**

Title : Development of XXX aircraft

Key word : Develop a cost effective XXX aircraft

		A		B		C		
Div	DTC Phase		Step Title		Input			
					Items		Pre-assurance activity	
Concept design and deployment	I -1	Establishment of concept	Approval of implementation plan document		1.Design base line and estimation method of production unit cost 2.Assembly sequence chart (pre-draft).		1. Establish the development cost control implementation plan document	
			Establishment of basic concept  (Design work by DTC work sheet)		1.Design baseline 2.Assembly sequence chart (Pre-draft) 3.WBS(level5) 4.1st RFQ to equipment vendor		1.Establish the work priority of DTC work sheet. 2 Review of design base- line by designer, prod. planner, purchasing person to do DTC. 3.Work by DTC work sheet. 4.Obtain 1st estimation from vendor. 5.Estimate and allocate target cost of production (level 5.1st time)	
	I -2	Development of concept	Establishment of concept drawing and allocation of target cost(2nd time)		1.Basic concept 2.Assembley sequence chart(Draft) 3.List of wants 4.Preliminary estimation of equipment by vendor 5.1st estimationof equipment by vendor		1.Clearly define the engineering concept and estimate the cost by using the cost estimating worksheet 2.Complete basic concept Dwg. 3.Review the target cost(level 5) by basic concept drawing	
	I -4		Development of design	Parallel Work	Completion of basic plan dwg and allocation of target cost		1.Trade the concept by using DTC trade work sheet 2.Make the drawing according to the result of trade study 3.Estimate the cost by above 2 and review target cost	
		Selection of engine			1.The wants for engine and adjustment items by design group 2.RFQ to engine manufacturer by Government 3.Explanation of detail of engine to primecontractor and Government by potential engine manufacturer 2.DTC trade study at potential eng. mfr. 3.Work together as necessary 4.Draw a/c plan dwg for each potential eng.			
		Selection work of equipment and vendor			1.Second RFQ(draft) a. Engineering reqts. b. Condition to estimate c. Buyer's term and condition for basic material purchase agreement d. Requirements for DTC			
	Detailed design	II -1	Detailed plan dwg.	Design work by DTC trade worksheet to complete the detailed drawing		1.Basic plan drawing 2.Target cost(WBS level 5) 3.Measure idea(draft) to realize the target cost		1.Make detailed design cost control implementation plan 2.Design work by DTC trade worksheet 3.Re-allocate target cost by reviewing detailed plan dwg.
II -2		Parallel Work		Detailed design (Manufacturing drawing by cost driving factor		1.Detailed plan drawing 2.Cost driving factor		1.Proceed the design work concerning cost driving factor 2.Draw detailed drawing in accordance with result of DTC trade study at detailed drawing phase 3.Proceed the plan drawing detail examination meeting (P-dwg. Exam.meeting) with production and purchasing people before starting to draw each manufacturing drawing at prime-contractor and sub-contractor company
II -3				Manufacturing planning		1.Manufacturing drawing (draft) 2.Manufacturing drawing (decided) 3.Target cost(level5) 4.Main planning work		1.Pre-plan work (Adjust and solve the problem of mfg. and purchasing) 2.Main planing work
Test	III -1	Production of No.1 aircraft and its Evaluation	Parallel Work	Production of aircraft for test and examination completion		1.Manufacturing drawing 2.Operation procedure sht. 3.Jig drawing 4.Purchasing condition 5.Rule of summerizing the resulting cost		1.Produce test specimen 2.Produce test aircraft  1.Improve aircraft using by result of engineering and flight test
	III -2			Final examination and verification of unit production cost		1.Improved aircraft 2.Sum of practical cost in development		1.Evaluate result of test aircraft and choose the planned improvement in production aircraft 2.Estimate to do the above

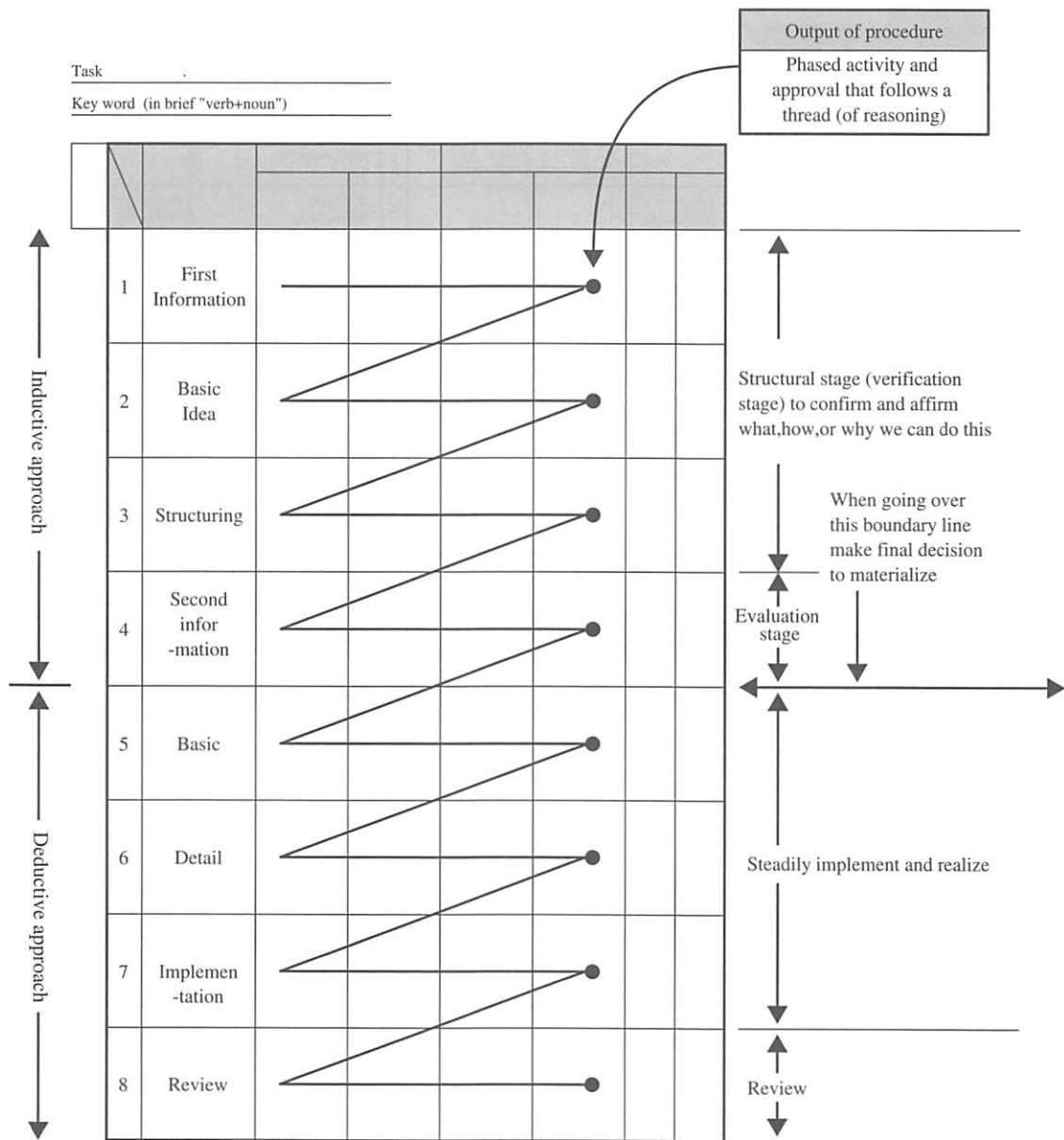
(Note) 1. The evaluation to reach the target cost in each phase is done by scheduled cost status curve, present cost status and not examined but theme/ideas effort in later phases.

(Note) 2. Life cycle cost evaluation is to be done by difference cost by life cycle cost of possible design idea not, estimating the total cost of life cycle.

D		E	F	G	H
Output		Other conditions	Who approve the output and schedule	Scheduled attends at output exam. Meeting	
Items	Post-assurance activity				
1. The development and cost control implementation plan document	1. Approve the development and cost control implementation plan document	1.The implementation plan document is to be approved with design concept examination	1981/12/mid •Chief engineer •Project manager •Government side project manager	Person concerned with planned document examination	
1.Basic concept drawing 2.WBS 3.Target Cost(LEVEL5) 4.List of Want 5.Assembly sequence Chant(elsrft) 6.Preliminary estimation of equipments	1.Examination of the conceptual drawing by company and Government officer	1.Target cost(level 5,preliminary must be approved at this phase 2.Wants means the necessary conditions to allocate the target cost from the point of design and manufacturing engineering	1982/2 end •chief engineer •Project manager •Government side project manager	Person concerned with completion examination	
1.Basic concept drawing 2.Allocated target cost (level 5,1st time) 3.Create measure, idea, (plan)to realize the target cost •Items how proceed •Condition how to purchase	1.Adjust and agree how to proceed the task of left side column among the concerned section(planning, purchasing quility controller) 2.Examine and approve the designed drawing(part 1)		1982/5 end •Chief engineer •Project manager •Government side project manager	Person concerned with basic design examination (Part 1)	
1.Basic plan drawing 2.Assembly sequence chart 3.Jig drawing of long lead time 4.Target cost(level5,3rd time)	1.Approve basic plan dwg 2.Approve the allocated cost of each subcontractor portion	1.All pre-review examination work is to be proceeded by reviewing the DTC trade studied result and the cost status report graph			
1.Final proposal from potential engine manufacturer 2.Aircraft plan drawing for each potential engine	1.Survey of engine manufacturer by design design team (engineer,purchasing etc.) 2.Contractors work together with Government in final engine selection		1982/10 end •Chief engineer •Project manager •Government side project manager	Person concerned with basic design examination (Part 1)	
1.Final proposal of equipment vendor 2.Purchasing agreement with vendor(draft)	1.Compare and select the eqt. And vendor 2.Draw plans of selected result 3.Contract with selected vendor 4.Start DTC trade work at eqt. Vendor. (1)High cost eqts. (2)High cost materials	The RFQ to vendor must be twice: 1st RFQ is to find what ca be purchased or developed. 2nd RFQ is to define final specification which we want to buy The 1st RFQ result and detailed examination on aircraft design side			
1.Detailed design cost control implementation plan dwg. 2.Detailed plan drwaing 3.Target cost (level 5,final) 4.Assembly sequence chart 5.Jig drawing of long lead item	1.Approve the detail design cost control implementation plan 2.Approve detailed drawing	Approval of detailed design cost control implementation plan must be done with detail planned drawing examination	1983/3 end •Chief engineer •Project manager •Government side project manager	Person concerned with basic design examination (Part 1)	
1.Manufacturing drawing (draft) 2.Manufacturing drawing (decided)	Manufacturing drawing (decided) are released after pre-planning work by manufacturing work by manufacturing group	1.Pre-planning means mfg. Plan by draft of mfg. Drawing 2.Final-planning means mfg. Plan be decided mfg. Drawing 3.The monitoring of effort in P-drawing examination meeting is evaluated by counting the number of created theme/ideas vs the scheduled curve for monitoring	1983/3 end •Chief engineer •Government side project manager		
1.Operation procedure sheet 2.Jig drawing 3.Purchasing condition 4.Estimation of unit production cost( -3)	1. Approval of output items		About 1984/6 end •Chief of production planning of each company (main and sub)		
1.Test specimen 2.Improved aircraft 3.Sum of practical cost	1.Examine and evaluate the final result in development examination meeting		1986/3 end •Chief engineer •Project manager •Government side project manager	Person concerned with basic design examination	
1.Improvement item for production cost 2.Estimation of production cost 3.Estimation of production jig	1.Prepare the production phase contract 2.Summerize the result and activities of DTC work		1985/3 end Estimation completion for production budget		

(Quated from Aero-space Engineering Hand Book , Japan Society of Aero-space ; 1992 & 2005 Edition , Maruzen Publishing Co. Tokyo) ; originally made by author

**Fig 4-9 Relationship of the fundamental Steplist and the actual Steplist**



Reduced size of Fig 4-8 Steplist of DTC for military aircraft, Aircraft system, total (Same as Fig.4-7)

Title : Development of XXX aircraft

Key word : Develop a cost effective XXX aircraft

Div	DTC Phase	Step Title	Input		Output		Other conditions	Who approve the output and schedule	Scheduled attends at output exam. Meeting
			Items	Pre-assurance activity	Items	Post-assurance activity			
Concept design and deployment	I-1 Establishment of concept	Approval of implementation plan document	1.Design base line and estimation method of production unit cost 2.Assembly sequence chart (pre-draft)	1. Establish the development cost control implementation plan document	1. The development and cost control implementation plan document	1. Approve the development and cost control implementation plan document	1.The implementation plan document is to be approved with design concept examination	1981/12-14 -Chief engineer -Project manager -Government side project manager	Person concerned with planned document examination
		Establishment of basic concept (Design work by DTC work sheet)	1.Design baseline 2.Assembly sequence chart (Pre-draft) 3.WBS(level5) 4.1st RFQ to equipment vendor	1.Establish the work priority of DTC work sheet 2.Review of design base, first by designer, then planner, purchasing person to do DTC. 3.Work by DTC work sheet 4.Obtain 1st estimation from vendor. 5.Estimate and allocate target cost of production (level 5.1st time)	1.Basic concept drawing 2.WBS 3.Target Cost(LEVEL5) 4.List of WBS 5.Assembly sequence Chart(draft) 6.Preliminary estimation of equipment	1.Examination of the conceptual drawing by occupancy and Government officer	1.Target cost level 5 preliminary must be approved at this phase 2.WBS covers the necessary conditions to allocate the target cost from the point of design and manufacturing engineering	1982/2 and -Chief engineer -Project manager -Government side project manager	Person concerned with completion examination
	I-3 Development of concept	Establishment of concept drawing and allocation of target cost(2nd time)	1.Basic concept 2.Assembly sequence chart(Draft) 3.List of WBS 4.Preliminary estimation of equipment by vendor 5.1st estimation of equipment by vendor	1.Clearly define the engineering concept and estimate the cost by using the cost estimating worksheet 2.Complete basic concept Dwg. 3.Review the target cost(level 5) by basic concept drawing	1.Basic concept drawing 2.Allocated target cost (level 5.1st time) 3.Create measure, idea, (plans) to realize the target cost -Decide how proceed -Consider how to purchase	1.Adjust and agree how to proceed the task of left side column among the concerned sections(planning, purchasing, quality controller) 2.Examine and approve the designed drawing(part 1)		1982/5 and -Chief engineer -Project manager -Government side project manager	Person concerned with basic design examination (Part 1)
	I-4 Development of design	Parallel Work Completion of basic plan dwg and allocation of target cost	1.Basic concept drawing 2.Target cost(level 5) 3.Measure idea(plan) to realize target cost	1.Take the concept by using DTC trade work sheet 2.Make the drawing according to the result of trade study 3.Estimate the cost by above 2 and review target cost	1.Basic plan drawing 2.Assembly sequence chart 3.Jig drawing of long lead time 4.Target cost(level 3,2nd time)	1.Approve basic plan dwg 2.Approve the allocated cost of each subcontractor portion	1.All pre-review examination work is to be proceeded by reviewing the DTC trade studied result and the cost status report graph		
		Selection of engine	1.The wants for engine and adjustment items by design group 2.RFQ to engine manufacturer by Government	1.Elaboration of detail of engine to subcontractor and Government by potential engine manufacturer 2.DTC trade study at potential eng. mfr. 3.Work together as necessary 4.Draw alt plan dwg for each potential eng.	1.Final proposal from potential engine manufacturer 2.Aircraft plan drawing for each potential engine	1.Survey of engine manufacture by design design team (engine purchasing etc.) 2.Construction work together with Government in final engine selection		1982/10 and -Chief engineer -Project manager -Government side project manager	Person concerned with basic design examination (Part 1)
		Selection work of equipment and vendor	1.Second RFQ(draft) a. Engineering reqs. b. Condition to estimate c. Buyer's item and condition for basic material purchase agreement d. Requirements for DTC	1.Decide final specification and target cost and send RFQ to potential vendor 2.DTC trade work at vendor 3.Vendor makes final proposal for selection	1.Final proposal of equipment vendor 2.Purchasing agreement with vendor(draft)	1.Compare and select the opt. And vendor 2.Draw plans of selected mech 3.Connect with selected vendor 4.Start DTC trade work at opt. Vendor. (1) High cost opt. (2) High cost materials	The RFQ to vendor must be clear. 1st RFQ is to find what can be produced or developed. 2nd RFQ is to define final specification which we want to buy. The 1st RFQ result will decided examination on cost design risk		
Detailed design	II-1 Detailed plan dwg.	Design work by DTC trade worksheet to complete the detailed drawing	1.Basic plan drawing 2.Target cost(WBS level 5) 3.Measure idea(draft) to realize the target cost	1.Make detailed design cost control implementation plan 2.Design work by DTC trade worksheet 3.Re-allocate target cost by reviewing detailed plan dwg.	1.Detailed design cost control implementation plan dwg. 2.Detailed plan drawing 3.Target cost (level 5,final) 4.Assembly sequence chart 5.Jig drawing of long lead time	1.Approve the detail design cost control implementation plan 2.Approve detailed drawing	Approval of detailed design cost control implementation plan must be done with detail planned drawing examination	1983/3 and -Chief engineer -Project manager -Government side project manager	Person concerned with basic design examination (Part 1)
		Parallel Work Detailed design (Manufacturing drawing by cost driving factor)	1.Detailed plan drawing 2.Cost driving factor	1.Present to design work concerning cost driving factor 2.Draw detailed drawing in accordance with result of DTC trade study at detailed design phase 3.Present to plan drawing detail examination meeting (P-dwg. Exam meeting) with production and purchasing people before starting to draw and manufacturing drawing at price committee and subcontractor company	1.Manufacturing drawing (draft) 2.Manufacturing drawing (decided)	1.Manufacturing drawing (decided) are released after pre-planning work by manufacturing group	1.Preplanning process only. Plan by detail of dwg. drawing 2.Final planning process only. Plan to detailed city drawing 3.The concerning of effect in P-dwg. examination meeting is evaluated by counting the number of opened questions to be scheduled care for concerning	1983/3 and -Chief engineer -Government side project manager	
		Manufacturing planning	1.Manufacturing drawing (draft) 2.Manufacturing drawing (decided) 3.Target cost(level5) 4.Main planning work	1.Pre-plan work (Adjust and solve the problem of idtg. and purchasing) 2.Main planning work	1.Operation procedure sheet 2.Jig drawing 3.Purchasing condition 4.Estimation of unit production cost -3)	1. Approval of output items		About 1984/6 and -Chief of production planning of each company (main and sub)	
Test	III-1 Production of No.1 aircraft and its Evaluation	Parallel Work Production of aircraft for test and examination completion	1.Manufacturing drawing 2.Operation procedure sheet 3.Jig drawing 4.Purchasing condition 5.Rule of concerning the resulting cost	1.Produce test specimen 2.Produce test aircraft 3.Improve aircraft using by result of engineering and flight test	1.Test specimen 2.Improved aircraft 3.Scen of practical cost	1.Examine and evaluate the final result in development examination meeting		1984/9 and -Chief engineer -Project manager -Government side project manager	Person concerned with basic design examination
		Final examination and verification of unit production cost	1.Improved aircraft 2.Scen of practical cost in development	1.Evaluate result of test aircraft and choose the planned improvement in production aircraft 2.Estimate to do the above	1.Improvement item for production cost 2.Estimation of production cost 3.Estimation of production jig	1.Prepare the production phase contract 2.Examine the result and activities of DTC work		1985/3 and -Estimation completion for production budget	

2. Making the Reasonable Purchase Price Steplist: The Proper Purchase Price Steplist is indicated in diagram 4-11. Although I would like to explain the details in my new book "How to decide the reasonable purchase price" (tentative title), if I were to simply explain the mechanism it would be as follows.

Although the Steplist is divided into the

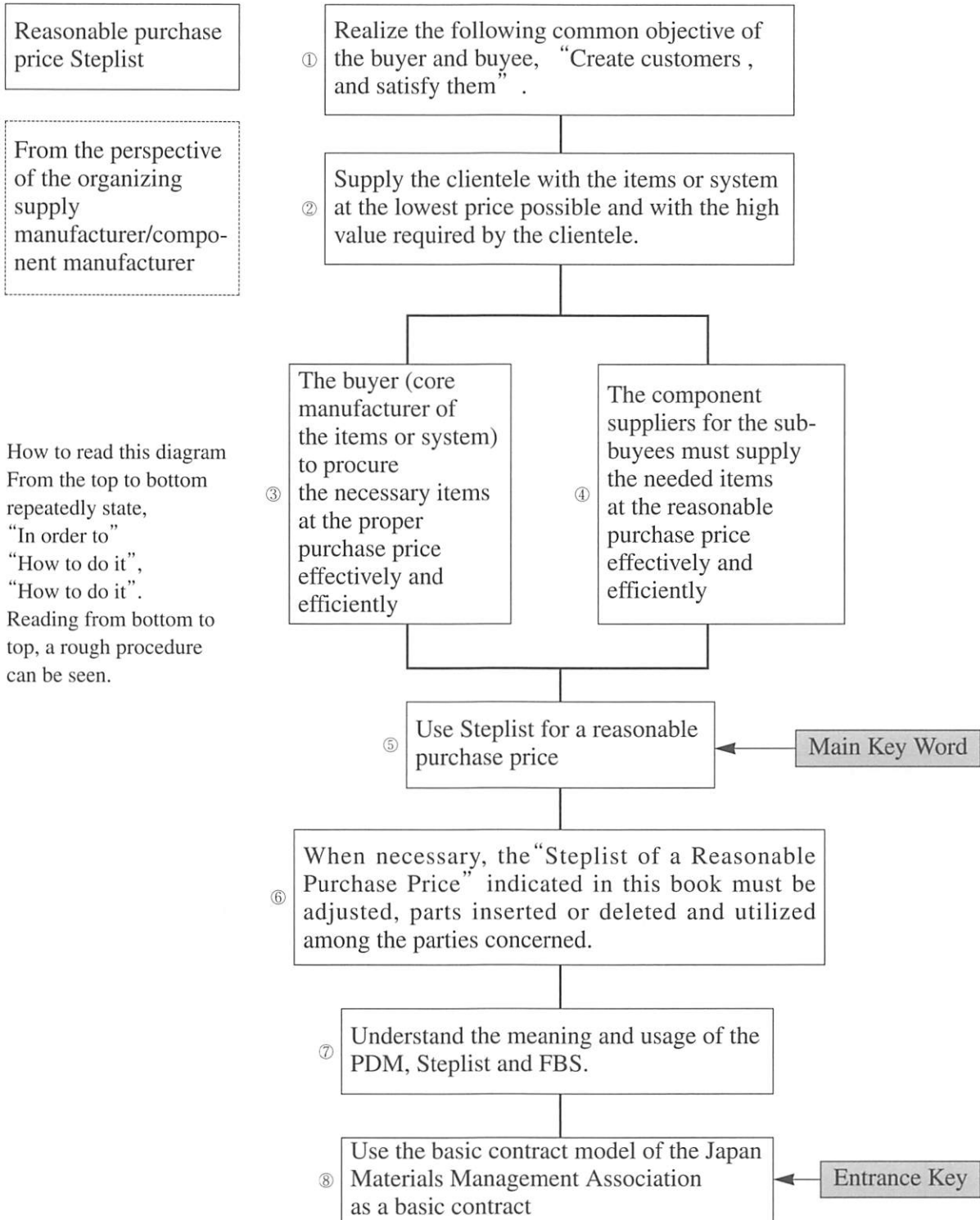
- ① Concept Comparison Phase,
- ② Breakdown and structuring Phase,
- ③ Implementing Phase,
- ④ Steady Phase and
- ⑤ Review Phase,

for any of the phases, whenever new information, technology (including management engineering and methodology ) is outputted, they are inputted into the input side and as a matter-of-course under the principle of review, they are made useable at each step. Moreover, for any purchased goods it is acceptable to add or remove the contents of each item

(NOTE)

Regarding ⑦ Fig.4-10, in order to understand the details of the Basic Contract, refer to Appendix2.

**Fig 4-10 A Specific Steplist of the Reasonable Purchase Price (PMD)**



**Fig 4-11 Steplist for Reasonable Purchase Price**

(Note) 1 . Approved by manager or chief of section is required before any output step is to be utilized for next input step.  
2 . In case no solution is available at each step, it is necessary to return to the previous step.

Step	Steps	Input		Output		Price standard	Notes	Output approval level
		Items	Pre-assurance activity	Items	Post-assurance activity			
Concept comparison phase	I	<ul style="list-style-type: none"> <li>Definition of task requirements</li> <li>Selection of item subject to purchase or system (Eng.)</li> </ul>	<ul style="list-style-type: none"> <li>To choose person who takes care of settling company's international matters &amp; person related in each department</li> </ul>	<ul style="list-style-type: none"> <li>Specification of our company (draft)(Eng.)</li> <li>Specifications of estimate terms and conditions ( I ) (prod.) (material)</li> </ul>	<ul style="list-style-type: none"> <li>Check contents of spec. according to checklist</li> <li>Approve the terms and conditions of estimation</li> </ul>			
	II	<ul style="list-style-type: none"> <li>Selection of applicable vendor for estimate (Qualitative)</li> <li>List of applicable vendors and part No..</li> <li>Specifications of our company (draft)</li> <li>Terms and conditions for estimation ( I )</li> </ul>	<ul style="list-style-type: none"> <li>Advertise for Applicable vendor (domestic and foreign)</li> <li>Review vendor's year book</li> <li>Send RFP to applicable vendor</li> </ul>	<ul style="list-style-type: none"> <li>Vendor's Specifications</li> <li>Vendor's estimation ( II )</li> </ul>	<ul style="list-style-type: none"> <li>Evaluation of vendor's design/productio n facility</li> <li>Evaluation of vendor's financial ability</li> </ul>		<ul style="list-style-type: none"> <li>Evaluation of ability is to be made according to past &amp; present business accomplishments</li> </ul>	
	III	<ul style="list-style-type: none"> <li>Evaluation of fulfillment for price &amp; engineering requirements</li> <li>Vendor's specifications (draft)</li> <li>Vendor's estimation ( II )</li> <li>Budget/target price</li> <li>Data for similar item(specifications and price)</li> </ul>	<ul style="list-style-type: none"> <li>Review specifications and estimation</li> </ul>	<ul style="list-style-type: none"> <li>Combine specification of our company &amp; vendor.</li> <li>Vendor's re-estimation with price &amp; cost data ( III )</li> <li>Implementation plan</li> <li>Preliminary test plan (as required)</li> <li>Comparison table of potential vendors.</li> </ul>	<ul style="list-style-type: none"> <li>Evaluate the technical &amp; financial accomplishment for requirements.</li> <li>Check if the product already on the market</li> <li>Compare with master schedule &amp; see if there is enough time.</li> <li>Clarify critical path</li> <li>Make comparison worksheet for final selection of each purchase part item.</li> </ul>	Similar price Budget price Functional price	Evaluate quotation by price and cost table of maker is required to provide the price and cost table.	
Breakdown structuring phase	IV	<ul style="list-style-type: none"> <li>Selection of vendor</li> <li>Combined specifications of our company and vendor</li> <li>Vendor's estimation ( III )</li> <li>Budget/target price</li> <li>Schedule (draft)</li> <li>Plan for preliminary test(as required)</li> <li>Comparison worksheet for final selection</li> </ul>	<ul style="list-style-type: none"> <li>Examine of requirements by functional test and inspection of initial product; Q/T,FAI</li> <li>Examine patents</li> <li>Negotiate the price and fix the quotation</li> </ul>	<ul style="list-style-type: none"> <li>Preliminary selected vendor</li> <li>Final specifications</li> <li>General plan</li> <li>Final quotation (IV)</li> <li>(According to nego. result.)</li> <li>Price and cost data and table(IV)</li> </ul>	<ul style="list-style-type: none"> <li>To check adequacy (Major assurance)</li> <li>Check that price &amp; cost table data are consistent by sampling. ( use technique of sampling, similar part, weight, etc.)</li> </ul>		Take contingency plan leading up to first delivery of lot 1 & other risks.	
	V	<ul style="list-style-type: none"> <li>Placing order and carrying out plan</li> <li>General plan</li> <li>Final quotation ( IV )</li> </ul>	<ul style="list-style-type: none"> <li>Final negotiation prior to contract (delivery term, price etc. )</li> <li>Examination of final quotation</li> </ul>	<ul style="list-style-type: none"> <li>Purchase order</li> <li>Actual schedule up to delivery date of first lot.(including functional test &amp; inspection requirements for initial product; Q/T, FAI</li> </ul>	<ul style="list-style-type: none"> <li>Make contract</li> <li>Check detail schedule(to clarify critical path)</li> <li>Make periodic report for schedule, and determine who is responsible at each checkpoint of schedule.</li> </ul>	Similar price Budget price Arranged price Price of cost table analysis	To clarify the division responsible & person in charge when follow-up is scheduled. Implementation phase	



Step	Steps	Input		Output		Price standard	Notes	Output approval level
		Items	Pre-assurance activity	Items	Post-assurance activity			
Implementation phase	VI	<ul style="list-style-type: none"> <li>Submitted manufacturing schedule</li> <li>Engineering design</li> <li>Actual manhour</li> <li>Grasped achievements for standard amount of material</li> <li>Price cost table(IV)</li> <li>Terms and conditions of estimation(VI)</li> </ul>	<ul style="list-style-type: none"> <li>Obligate vendor to prepare cost data of lot 1</li> <li>Determine processing man-hour by dividing into SET &amp; RUN</li> </ul>	<ul style="list-style-type: none"> <li>Standard manhours on mfg. shop order</li> <li>Product result improvement item, manufacturing problem, performance and the improving schedule</li> <li>Price &amp; cost data table by actual result(VI) (Divide into non-recurring &amp; recurring expenses)</li> </ul>	<ul style="list-style-type: none"> <li>Check the result according to checklist</li> <li>Select of drill-check point.</li> <li>Clarify the item(draft) for improvement.(Estimate necessary amount money for improvement)</li> <li>Decide which price system can be taken "fix price or lot size pricing" (See remarks)</li> </ul>		<ul style="list-style-type: none"> <li>Review previously determined matter between our company and vendor, the person in charge to summarize the actual result in manufacturing and performance.</li> <li>Apply the learning curve.</li> <li>Take corrective action for material and parts by actual measurement &amp; actual purchasing price.</li> <li>Clarify process cost by the difference between actual and the standard time.</li> <li>In lot size pricing, the price is decided according to the lot size ordered in proportion to non-recurring &amp; recurring expense.</li> </ul>	
		<ul style="list-style-type: none"> <li>Schedule to put into practice the draft for improvement of production</li> <li>Extraction of controversial points from contingency standpoint</li> <li>Terms &amp; conditions for improvement(VII)</li> <li>List of what prices are consistent(VI)</li> <li>Data to review establishment of price &amp; delivery terms</li> </ul>	<ul style="list-style-type: none"> <li>Proceed technical survey</li> <li>Calculation of standard manhours</li> <li>Check and find the difference in technique by comparing standard manhours between two vendors</li> </ul>	<ul style="list-style-type: none"> <li>Periodic report of the results executed for promotion.</li> <li>Established practical method by eliminating the contingency factors.</li> <li>Examined result by our company of the price, cost data, profit &amp; re-establishment of unit price as required(VII)</li> <li>Established schedule to proceed annual review</li> </ul>	<ul style="list-style-type: none"> <li>Review the result by specialist</li> <li>Refer to standard quality</li> <li>Check according to checklist</li> <li>Equalization of profit</li> <li>Decide the theme to be reviewed annually</li> <li>Establish VA plan to proceed</li> </ul>	Price standard manhours * rate + G.C.I.P Use cost analysis technique Use learning curve costing technique.	<ul style="list-style-type: none"> <li>(Check according to cost analysis technique by using cost and price breakdown table)</li> </ul>	
Review phase	VII	<ul style="list-style-type: none"> <li>Annual review &amp; stage of analysis)</li> <li>Submitted theme to be reviewed</li> <li>Submitted items to be examined with VA contract</li> <li>Policy and examination of design changes</li> </ul>	<ul style="list-style-type: none"> <li>Settle the contents of VA contract</li> <li>Settle the contract Design changes as necessary</li> </ul>	<ul style="list-style-type: none"> <li>Items put into practice as a result of review.</li> <li>Summarization of V.A. activity results.</li> <li>Enforcement schedule for design change.</li> </ul>	<ul style="list-style-type: none"> <li>Review and negotiate the reasonable price due a recommendable price according to design change</li> </ul>	<ul style="list-style-type: none"> <li>Method of cost analysis by using price and cost breakdown table.</li> <li>Wage rate</li> <li>Standard price of material</li> <li>Escalation clauses with indices</li> </ul>	<ul style="list-style-type: none"> <li>Related matter to be discussed</li> <li>Standard of VA contract(draft)</li> <li>1st year to pay vendor 50% of money saved by V.A. after subtracting the money to proceed V.A. activity.</li> <li>2nd year ; Pay 40%</li> <li>3rd year ; Pay 30%</li> <li>4th year ; Pay 20%</li> <li>5th year ; Pay 10%</li> </ul>	

## **Column 1: Relationship between offer and acceptance**

### **1. Example of an Offer and Acceptance relationship (Part 1)**

The time I went to the Great Pyramids in Giza. Men pulling camels came up to me and enthusiastically told me to get on. At first, the rate was ten pounds (EGP) for three minutes. When I answered that I had no desire to get on, the rate was reduced to 1 pound for 1 minute. This converts to less than US 25 cents. Moved by their diligence, my travelling companion and I agreed to the terms.

Camels first rise from their hindlegs and then stretching their forelegs, they stand up. The inclination of this action is so steep that the rider must cling onto the saddle to prevent from being tossed off the camel. Moreover, the camel stands so high that there was some thrill to sitting on it. Knowing the scariness in trying to get off a standing camel, the owner probably devised the following scheme. "We haven't negotiated the price to get off the camel. Pay \$20." he said. A crook he was.

My companion who was light weight had no problems jumping off, but this was out of the question for me. Feeling bothersome at the situation I said, "I'll pay you \$20 and so let me down." These words seemed to put some fear in the camel owner. After getting off, the man said, "This is a promise between men. Promise me you will not go to the police." He repeated this several times and did not seem to want the \$20.

Then suddenly it came to me. In this country or region, the people negotiate extensively. However, when one tells you to pay an unreasonable amount of money if you want to be let down from a camel, this is no longer a business negotiation, but simply coercion. "I'll ask the guide if this is the standard way in Egypt," I told him and then the camel owner brought the price down to 3 pounds.

While sitting on the saddle of the camel, the control of the talks would be in the hands of the camel owner. If one negotiates under such conditions, the direction of the negotiations would be controlled by the other party and extra time and money will be lost. When I agreed to pay the sum of money and got off, the power of the negotiation fell into my hands. Because the camel owner used an unjustified means and an extravagant price, he entered a vulnerable position in the negotiation.

Securing the initiative is always advantageous in negotiations. My companion as well as I took

different measures, but we both took the initiative. At least some good came out of my mishap I thought.

(Nihon Keizai Shimbun (Japan Economic Newspaper) evening edition August 25, 2000, "Topics for Tomorrow: 'A camel owner in Giza'" with excerpts from the president and Mr. Keiyuki Kasai of Central Japan Railway.)

## **2. An important example showing the relationship of the Offer and Acceptance (Part 2).**

The price of buying and selling of land:

Let us suppose that a landowner asks a leaseholder to purchase the land that is under lease. In most cases, the selling cost will become 50% of the usual cost for an empty lot and in severe cases it could fall down to 20%. This also holds true for cases where in the previous generation (of the parents) the leaseholder had not paid the landowner the money for leasing the land.

Moreover, if the leaseholder asks the landowner to sell them the land this time, the situation becomes completely reversed. That is, the buying and selling price in this case becomes the usual price of an empty lot.

Furthermore, if the leaseholder wishes to purchase the land at all cost, then sometimes the cost rises to above the regular price. This is called overturning the Offer and Acceptance. What can be learned from this Offer and Acceptance relationship is that depending on who begins the business negotiations, the outcome will change dramatically.

In conclusion, the 2 relationships for the Offer and Acceptance have been described above and they are as follows. In order to establish a social justice it is important to be able to judge the timing to form the Offer and Acceptance relationship, and even though the circumstances may be the same, depending on who starts the talks the success or failure (desirable or undesirable outcomes) will be decided.

## **Chapter 5 The 3-5 Phase Improvement Method: a method of supplementing the Steplist**

### **1. The 3-5 phase improvement that links improving the present state and planning for the future**

The Steplist method, which creates a faultless phased procedure for the mindset and actions, is supplemented by the 3-5 Phase Improvement method. That is, the Steplist creates a phased procedure for what needs to be done, but the 3-5 Phase Improvement does the following to realize the task.

- (1) Something that can be done immediately and effectively.
- (2) Something that should be done at once but can afford some time for preparation.
- (3) It is a method that classifies the thoughts and actions which should be implemented according to the Steplist method and each implementation item. In addition, the things that are presently being developed.
- (4) Measures that can be realized if a certain task can be solved.
- (5) The method that divides into 3 or 5 sections the implementation item which determines what task needs to be implemented in order to make the development possible or that states until the task itself is investigated the development plan cannot be made.

**The 3-5 Phase Improvement progresses the improvement measures and Steplist which make extensive improvements or balance the development.**

Fig. 5-1 shows the image of it and if I were to organize and restate the above, it would be as follows.

Diagram 5-1

Block diagram of the 3-5 improvement

Five Phase Measures

As to the Five Phase Measures, they are the following measures.

PHASE I measures: "Measures that can be done immediately and are effective" and "Are transition measures up to the PHASE II measures. "

**PHASE II** measures: Measures that should be realized as soon as possible, but need some preparations.

**PHASE III** measures: Measures that should be realized after much thought (using the Steplist method).

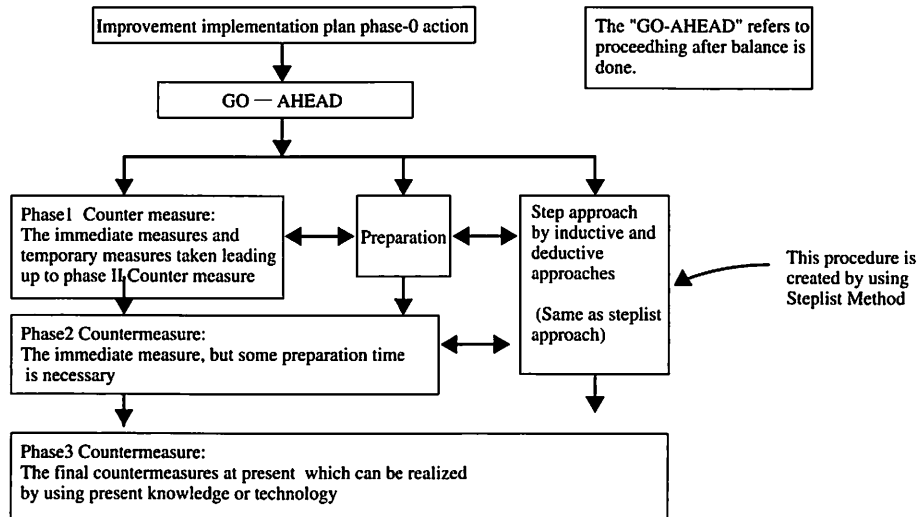
When the measures up to Phase III are adequate, no other measures are needed. However, when the task is complex and is a long-term one, the following measures are needed.

**PHASE IV** measures: Measures that can only be realized after the problem or task is solved.

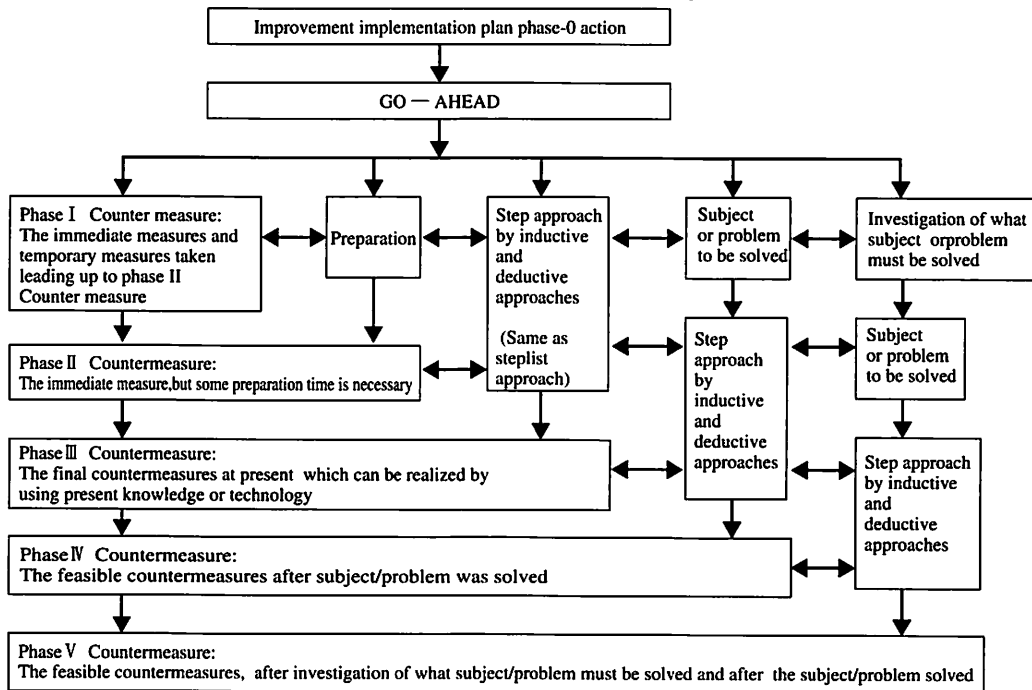
When the problem or task that need to be solved are not clearly defined, Phase V measures start by investigating them in order to clarify them. The core procedure for this has already been described in the 8-phased Steplist.

**Fig 5-1 Components Diagram of the 3-5 Phase Improvement Method**

It is a method of dividing the Improvement measure of the current state into 3 or 5 divisions and balancing



When trying to make development but the next step is not apparent, use 5 phase improvement below.



(Note) The meaning of phase-0 implementation plan is planning a document to show the policy of using the idea of the 3-5 improvement method to improve something.

During the Phase IV measures, the step that solves or realizes a certain problem or task is inserted before the usual 8-phased steps. And in the case of PHASE V measures, it is necessary to further insert a step before that step which investigates the problem or task that needs to be solved. Although each step of the Steplist will change according to the situation, in general it will become a 2- or 4-phased step.

## **2. Procedures for creating the 3-5 Phase Improvement**

In order to create a 3-5 Phase Improvement, the format of Diagram 5-2 (although this is the same format as PHASE III, in the case of PHASE V a column is added next to PHASE IV) is used and the following procedures are conducted.

1. First of all, establish the task.
2. Make a PMD.
3. Decide the MAIN KEY WORD according to the PMD.
4. The measures or implementation particulars that realize the MAIN KEY WORD are brainstormed and entered in the corresponding columns.

In that case, in order to embody the implementation particulars, the problem points must not be entered as done conventionally. The needed conditions or preparations to embody the implementation particulars are entered in the corresponding columns. This is the crucial point. If these are the necessary conditions to realize the implementation particulars, then the mindset of the PMD will set in motion the materialization of those conditions. That is, by just pointing out the problem, in most cases it will cause a standstill. This is what causes conventional improvement measures to come to a complete stop.

The phrase "problem point" will then be converted to "The necessary conditions or preparations to realize the upper level target," which is the same purpose and means relationship as the PMD, and the repetition of "in order to "How to do it" (verb and object), it is necessary to "How to do it"" will facilitate the actions.

5. The written cards are then broken down into 3 or 5 classifications and entered in the implementation particulars column.
6. The necessary implementation conditions, preparation conditions/supervisor and the date of the expected completion of the implementations are to be entered in the corresponding columns.
7. When it is necessary to further subdivide the implementation particulars, the implementation Schedule Chart or Implementation Plan are created for the 'branch' and 'sub-branches' (details in Chapter 7).

### **Points to remember in creating the Improvement Implementation Plan**

In improving the present conditions, it is by all means necessary to attain approval for the

Improvement Implementation Plan. The reason for this is because by putting into motion the improvement plan, it will have a great influence on those who have been involved up to now and can cause either confusion or interruption in their work. To avoid such confusion and to smoothly advance the improvement plan, the following points must be heeded.

(1) Format: Use the format of diagram 5-2.

(2) In order to embody the implementation particulars, the kind of conditions and preparations needed must be written down in the 'Conditions/preparations for Implementation' column. That is, the problem will be switched to a task here.

If the necessary conditions and preparations are stated in order to embody the implementation particulars without pointing out the problems, the mindset will change to finding what is needed to realize the necessary conditions and thus activities will be set in motion.

(3) Moreover, by switching the problem to a task, it can avoid embarrassing or hurting those who have been involved up to now and proceed with the improvement activities. That is, it will be much faster and create less friction when conducting the improvements than the conventional way of starting with the problem (problem solving).

As already indicated in Diagram 1-1, I would like you to recall that the problem can disappear by changing the problem into a task implementation.

Please refer to Fig. 5-3 in detail for an example of how to record using the 3-5 Phase Improvement format.



### Fig 5-2 Format of 3-Phase Improvement

[illegible]

**Fig 5-3 Filled example of the 5-phased improvement format**

Subject: The development of DTCN and DTC methodology in our company

Key word: Make implementation plan and develop it in our company by 3-5 improvement method

Phase I Countermeasure The immediate measure Temporary measures leading up phase2 countermeasure			Phase II Countermeasure The immediate measure but with some preparation			Phase III Countermeasure Final countermeasure by present information and knowledge		
Items to be done	Necessary conditions/ preparations	Ass'd person and schedule	Items to be done	Necessary conditions/ preparations	Ass'd person and schedule	Items to be done	Necessary conditions/ preparations	Ass'd person and schedule
1. Interested people or group learn and study DTCN and DTC methodology by help of DTCN consultant	Agree in the interested group to use temporary budget time and materials among interested group		1. Training in 7 basic methods of DTCN methodology	Budget and agree		1. Implementation plan to develop DTCN/DTC methodology in effective management for our company	Pre-plan	
			2. Printing of training manual	Budget and Task team				
			3. Training of minimum number of instructors.	Budget and Task team		2. Training of instructors	Select instructor	
2. Provide room for study group	Study group will be divided into DTCN group and DTC group		4. List of applicable areas and conditions	Question-naire				
			5. OJT of PMD in selected section	Budget and schedule		3. Apply DTC method in a selected project	Preparation committee	
3. Make several PMDs on selected themes (Including the most difficult theme)	Get help of DTCN/DTC consultant		6. OJT of steplist in necessary section	Budget and schedule		4. Apply DTCN method in a market creation project	Selection of theme and task team members	
			7. OJT to make implementation plan on the selected project	Select project				
			8. Gather opinions from people who are learning the method by OJT	Question-naire		5. Investigation to apply DTCN methodology in information system	Task team	
4. Make PMD to develop DTCN or DTC in our company			9. Investigation to use DTCN methodology in intellectual information technology system					

approved by : \_\_\_\_\_

promoter : \_\_\_\_\_

Phase IV Countermeasure Feasible countermeasure after the subject/problem is solved			Phase V Countermeasure The feasible countermeasure after investigation of what subject/problem must be solved and then after the subject/problem is solved		
Items to be done	Necessary conditions/ preparations	Ass'd person and schedule	Items to be done	Necessary conditions/ preparations	Ass'd person and schedule
1. Revise company regulations	Establish task team		1. Investigation of future applicable areas		
2. General training program in each method for people in each effective level	Plan and schedule		2. Investigation of subject / problem to be solved before entering the future applicable area		
3. Preliminary software development with information system	Impl. plan and budget		3. General and specific software development for each specific purpose		

## **Chapter 6 FBS (Function Breakdown Structure) technique: A method of creating the image of the most suitable mechanism and component of things and systems.**

### **1. What is the FBS technique?**

In previous chapters, the Steplist method was described to be a method where procedures are created, and in this chapter the FBS technique which creates the mechanism and breakdown structures of things and systems will be described. That is, it is a method which creates an idea to realize each image of the hierarchical function that was made (to make this, the mechanism and breakdown structure of things and systems were planned) in order to realize the given theme of systems and things. Then, at least 3 proposals are created, compared and evaluated and the most suitable one is chosen.

There are various themes. For instance, there is a task of creating a procedure to faultlessly build a house, and on the other hand, there is the task of creating the same house, but one with a mechanism and component where both the parents and married child could cohabit while protecting both families' privacies. The former task seeks a procedure, while the latter pursues a function and its mechanism and component.

In regard to tasks that pursue this function and mechanism, the FBS technique organizes and creates the original idea of something that has been done naturally and unconsciously up to now. It is an extremely effective and rational method. Conventionally, this method is used by those involved in design, however, I will explain it so that even those involved in clerical work will understand.

I will describe the details of this method because it can be applied to creating a new plan or concept by engineers and clerks working together.

### **2. Mechanism and Breakdown Structure of things and systems**

The mechanism and breakdown structure of things and systems in regard to the task can also be phrased, 'the structuralizing of things and systems based on the KEY WORD of the task.' Although this may sound complicated, this method is the mindset sequencing used by us unconsciously when we are about to set out on a task. As this can be better understood by an

example, I would like to use the following case, "An ergonomic desk for studying".

Fig.6-1 is the mechanism and component diagram of things and systems with the task, 'An ergonomic desk for studying'. It can be seen that 'An ergonomic desk for studying' has 7 steps. The explanation of each step is as follows.

**Fig 6-1 FBS Technique**

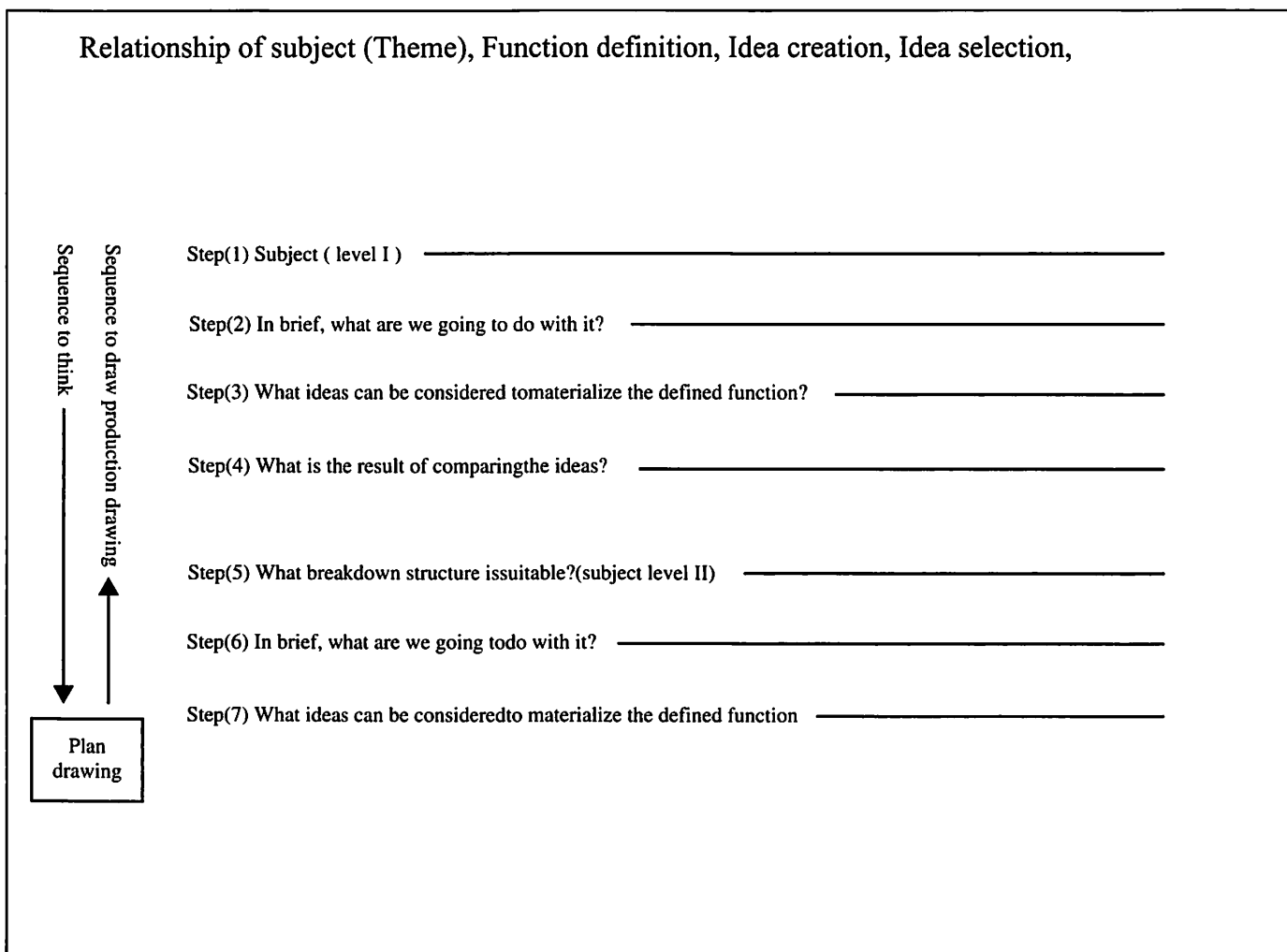
<Subject level I >

Step 1: Subject level = Task: 'An ergonomic desk for studying'

Step 2: KEY WORD level = in brief, what do we want to do with it → functional representation:  
'Prepare a platform with a suitable height so that many reference books, etc., can be spread out' .

Step 3: The 3 proposals for comparison → idea creation: 'ceiling-suspended type' , 'standing type (with legs)' and 'Cantilever type desk' .

Step 4: What are the results of the idea comparison?  
→ The selected one was the 'standing type'

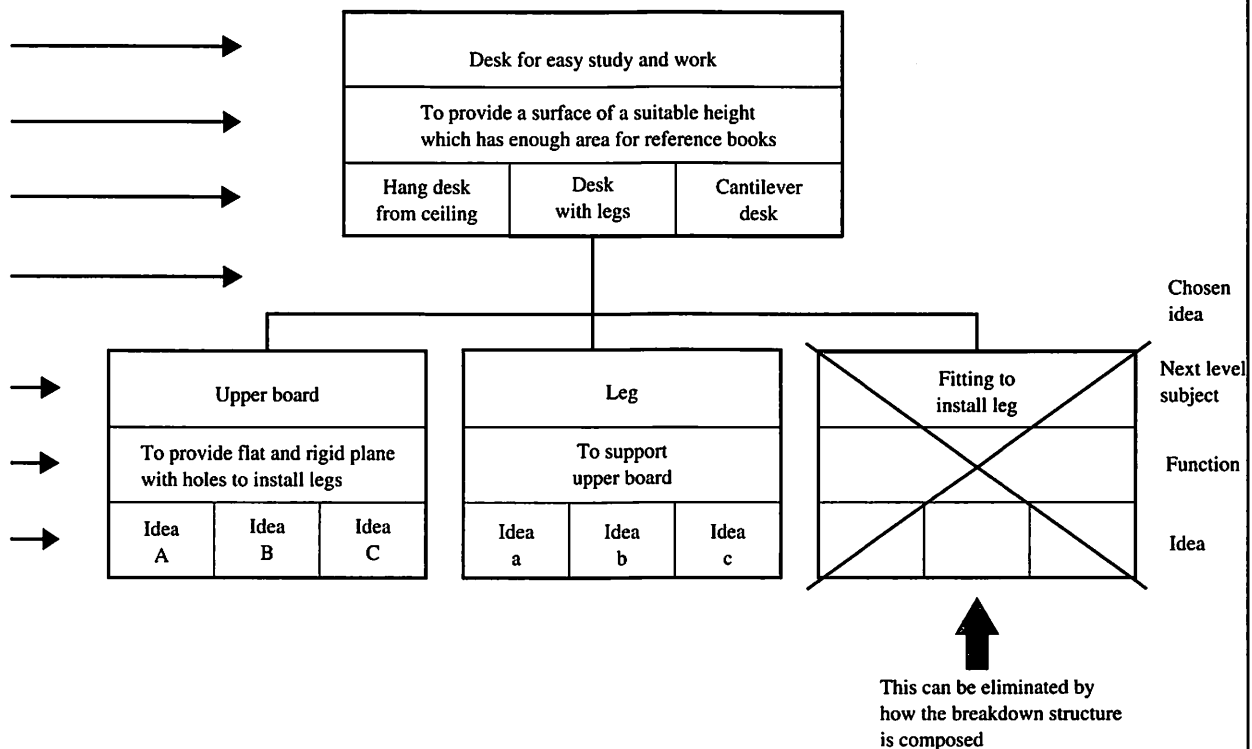


< Subject level II >

Step 5: How should the breakdown of the selected idea be divided and implemented → the task that configures the idea: 'top panel' and 'legs', here the component parts that will materialize the idea are deeply thought out, compared and decided for the structuralization proposal of 'How to make a breakdown and construct it'.

In the example diagram of the standing desk, the breakdown of the parts such as the top panel, legs and fitting to install legs are considered.

Next level subject by simple example.



However, if holes are made in the top panel so that it will fit on top of the legs, the clamps may be omitted from the scheme.

Step 6: next subject level = In order to do what? (What do we want to do with it?) functional representation of subject level : 'Provide flat and rigid plane with hole to install legs' : 'Support the upper board'.

Step 7: 2-3 ideas to create it \_ Idea creation of Subject level : "Top panel - idea A, idea B, idea C", "Legs - idea 'a' , idea 'b' , idea 'c' ", if we take the top panel as an example, the following 3 proposals can be considered 'top panel made of solid wood' , 'top panel made of stretched membrane (2 sides)' , 'top panel made of stretched membrane (1 side)' .

### **The mindset and procedures of the Mechanism and Breakdown Structure of things and systems**

The mindset and procedures of the mechanism and breakdown structure of things and systems follow the steps mentioned previously, but if I were to restate them, they would be as follows (please refer to Diagram 6-1).

Step 1: Establish the Subject or Theme.

Step 2: Establish the KEY WORD with respect to the Theme and establish the functional representation (You may use the PMD Methodology if necessary in order to obtain the most appropriate KEY WORD and the functional representation).

Step 3: Create 3 idea/image proposals for comparison in order to realize the function of the KEY WORD.

In this case, the 3 proposals should be of extremes. In most cases, the most suitable proposal will fall in between the 3 proposals which form a triangle.

Step 4: As a result of a comparative evaluation, one idea is selected.

Step 5: What kind of division will the breakdown consist of and how will it be realized? With what will the selected idea/image components be constructed with?

For example, 'top panel' , 'legs' , 'leg clamps' , etc., and these will become the task of the next level.

Step 6: Decide the KEY WORD (function) of the Subject of the next level.

Step 7: Create 3 proposals for comparison of the KEY WORD (function).



The following steps are a repetition of Step 3 and beyond.

The above is repeated until an overall image is completed. This is also called a scheme drawing and can confirm the entire structural character. A scheme drawing is a series of drawings that confirms from top to bottom the structure. On the other hand, in order to make a manufacturing drawing it will need to become a detailed design (that is, manufacturing design diagram). That is, it must follow from the bottom level (most detailed) to the top.

(Note 1)

If necessary, compare the next level's proposals or at the next level beyond that, examine whether the design element can be established and if confirmed that it can be, create proposals for comparisons and conduct comparative evaluations. In designing, this is known as a preceding component study or preceding structural study and is treated as an important developmental design task.

(Note 2)

The often used 'WBS of things and systems' in Project Management and System Management indicates only the extracted top-down relationship of the FBS theme name.

(Note 3)

The 'Functional schematics of things and systems' used in value engineering, indicates only the extracted top-down relationship of the FBS functional expression. Here, one must be careful to make sure that according to the ideal selection results, the lower level functional schematics are different.

Effectiveness yielded by the Breakdown Structure image created by FBS

Here, let us see specifically what kind of results can be attained by the mechanism and breakdown structure of things and systems according to the Subject.

**The expected effectiveness are the following.**

1. Conventionally, although the 'idea principle' which achieves the task through ideas is widely used, with this mindset once an idea is contradicted, the whole theme is seemed to be contradicted and little room is offered to come up with another new idea to solve the task. However, on the basis of the presented task if the mechanism and breakdown structure of things and systems are created and the mindset to provide specific wisdom is chosen, then by confirming the theme, it can be recognized that the idea is but one means. Furthermore, if one chooses the selection means, "Create 3 idea proposals for comparison", then there will be a larger pool for comparison and evaluation.
2. With this kind of FBS mindset, although it has been said that "Creativity is ideas", if seen from the perspective, "Creativity from task or theme", then a wider, deeper wisdom can easily be extracted and the most suitable proposal selection can be made. That is, in simpler terms,
3. If one begins using the mindset of the FBS technique which starts from the task, one can attain the highest value, most suitable proposal that can be realized.

### **3. A method of further deepening the image/idea**

As long as one aims to realize the task by keeping in mind the mechanism and breakdown structure of things and systems, from the above it can be understood that the image/idea of things can be made wider and deeper. However, there would remain some doubt as to whether or not it was the most suitable choice.

In order to deepen and make the most suitable image/idea, among the mechanism and breakdown structures of things and systems, there are the following.

- (1) How to make the most appropriate basic function expression of Step 2.
- (2) The method of selecting the most effective and efficient idea/image of Step 4.
- (3) In order to become the next task of Step 5, it is necessary to deepen the mechanism and breakdown structure of things and systems of the WBS technique.

By using an example of developing "An inexpensive and highly reliable small flashlight" (Diagram 6-2), I would like to explain each method.

### **A method of creating the most appropriate basic function expression (KEY WORD).**

As previously shown, the KEY WORD can be found using the PMD method (Purpose Measure Diagram), but the "most appropriate basic function expression" can also be understood using this PMD. Although this will overlap with the procedure for making the PMD, I will once again indicate the procedure.

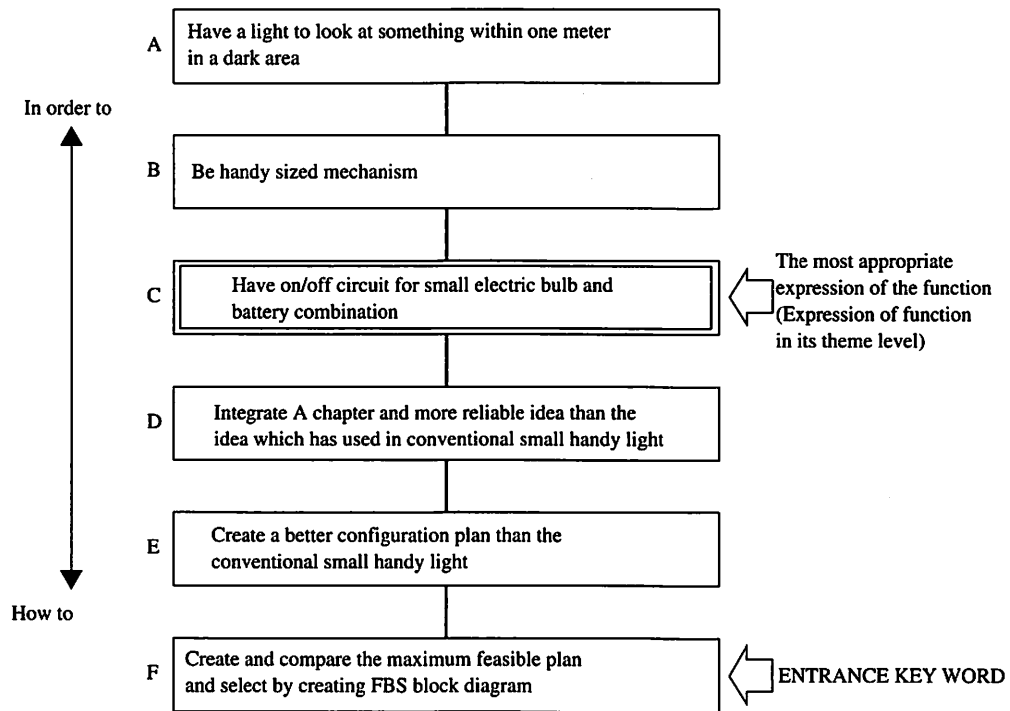
#### **Procedure**

- (1) Confirm the task provided as the design or plan objective.  
Here, it will be "An inexpensive and highly reliable small flashlight".
- (2) Next, think of all the expressions that can be thought of "In brief, how to do it" with respect to the task (use as little adjectives as possible, phrases may be used).
- (3) Use scissors to cut and separate them and by arbitrarily comparing 2 cards, place them vertically so that the upper card 'xx' will be related to the lower card 'yy' such that the expression, "in order to do xx, do yy" will be made.
- (4) Read the expressions once again from the top to the bottom and if there are no discrepancies then affix using mending tape.
- (5) Then, around the middle of the diagram find the most suitable expression label which contains both the upper and lower expressions and you will see that, "Only ... (that expression) needs to be done" will fulfill the task.

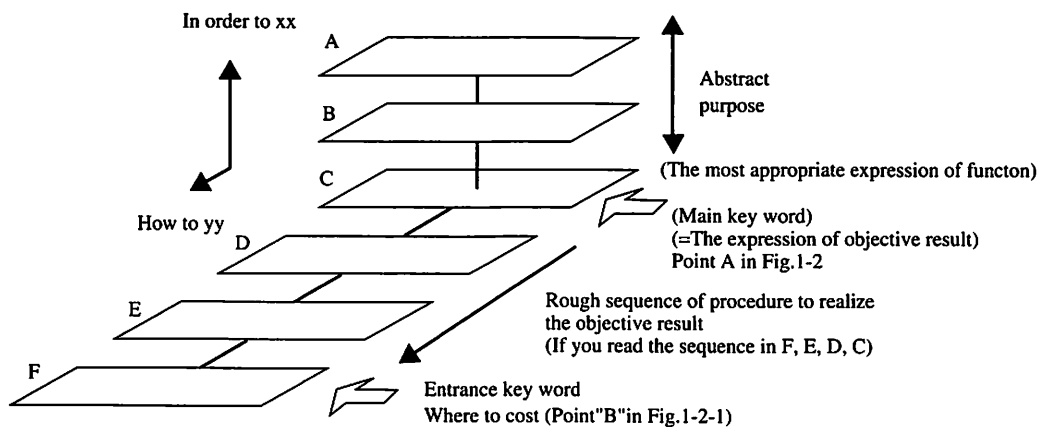
Then, mysteriously an expression that can be said is the "most appropriate function expression" may be found. From the above, what was attained was the PMD for "An inexpensive and highly reliable small flashlight" (Fig. 6-2) and the most suitable function expression. However, since the mindset of the FBS has already been acquired, the contents of the ENTRANCE KEY WORD expression have been changed.

**Fig 6-2 PMD of small handy light and its most appropriate expression of basic function**

Theme : Small handy light(level)



**Fig 6-3 The image sketch of where locate the expression of basic function**



### **Why does it become the most appropriate functional representation?**

Because you are probably wondering why the fixed functional representation will become the "most appropriate functional representation" by the PMD creation procedure, I would like to explain this point.

As indicated in Fig. 6-3

- (1) When the PMD, formed from the repeating Purpose and Means sequencing, is studied in detail, the following can be understood. That is, when one takes a close look at the expressions sequenced above and below the consequentially chosen MAIN KEY WORD "most appropriate function expression", the higher level expression is an "abstract purpose expression with a top-down relationship". On the other hand, the lower level expression when read upwards forms a rough procedure sequence.
- (2) What can be interpreted from this is that the "most appropriate function expression" is the final expression of the means.
- (3) The completed Purpose and Means relationship makes a connection in the direction of purpose-means from the abstract purpose to the starting means. This means that the "Direction of value" that is, "Direction of Will" in the theme has been defined.

By grasping the defined "direction of value" that is, "Direction of Will" and the fundamental "function of value" (that is, basic function expression), a mechanism which simplifies the creation of ideas, comparison, determination of importance and decision making of the proposal is made simultaneously.

From the above, it is proof that the results are nothing short of being the "most appropriate functional representation".

### **A method of creating the most reasonable idea and making its comparative selection**

In order to create a reasonable idea and to make a comparative study, the first step is to think of 3 or more ideas that can satisfy the "most appropriate functional representation" which can be compared. To come up with ideas, one may use the developed methods of the Idea technique, NM methodology and brainstorming "Most appropriate functional representation" (that is, MAIN KEY

WORD). (The NM methodology was created by Masakazu Nakayama and a book has been published "The complete guide to the NM methodology", Sanno Institute of Management Publications Dept.)

The method of organizing those results is the following procedure.

(1) First of all, think of various ideas and expand them to 3 extreme proposals.

(In the case of aircrafts as indicated in Diagram 6-5, they will be the 3 extreme proposals of cost minimum, weight minimum, reliability/maintenance maximum)

(2) Next, organize the proposals that can be realized but which are close to the extreme proposals.

(3) Keeping in mind that the 3 extreme proposals forms a triangle and that the most suitable proposal is found within it, a comparative evaluation is conducted to find it.

Furthermore, after creating the comparative proposals, use the 'DTC/LCC Trade Worksheet' found in the idea matrix column indicated in Fig. 6-4 to search for the most appropriate proposal. In fact, this Trade Worksheet was used to conduct a comparative evaluation of 3 proposals and make a decision for the XT-4 medium-sized training aircraft equipped with engine of the Defence Agency. Figure 6-5 is an example of what was written at that time. By looking at the lower left part of the diagram " trade graph : weight & cost ", the most appropriate proposal can be quickly determined.

**Thus, from the above it can be seen that the FBS method is extremely effective for themes that change the function of things and systems to tasks.**

If we consciously use the FBS in our daily work, our efforts would show considerable direction of value, attain effectiveness and demonstrate wisdom. Evaluate according to the necessity of the selected proposal (which is thought to be the most appropriate).

In this case, with the 4-box principle of the Steplist method, the characteristics that appears upon its usage or the related sequencing of the operation procedure, the conformity, operability and exactness of the existing Inputs and Outputs are checked when necessary. The 4-box principle of the Steplist is also demonstrated here. This method corresponds to the technical term, Function Flow Block Diagram (FFBD). Then, in cases where one is concerned about the item, an actual confirmation model of it is made and confirmed.

#### **4. Mechanism of decision making and judgment for actions**

Incidentally, would creating the 3 proposals and making a selection as indicated here, be a mechanism for judging 3 kinds of information and decision behavior, etc.? Since the "method of realizing the task and demonstrating wisdom" has dealings with not just the FBS system discussed in this chapter, but is related to everything, I would like to discuss the theoretical background here.

##### **Information of Difference by comparison and the mechanism of Behavioral Judgment**

##### **Information of Difference by comparison and direction of value**

When our daily rational behavioral judgment is observed on a minute level, it can be seen that from comparing the information we received, we make judgments on our actions (contrary to this, actions made on impulse does not support rational judgments). In regard to the object of the behavioral judgment, without comparing the "Information of Difference", that is, the difference in superiority of the information, one cannot make a behavioral judgment.

Let us use a familiar example to explain this. Suppose there are 2 jelly donuts that look exactly the same from the outside. Both are at the same reach and so there is no difference that can be discerned. Then, if we were to choose one to eat, momentarily we would hesitate and think, "which jelly donut should I eat?".

However, if we knew beforehand which donut had more or less jelly, we probably would not hesitate. We would think, "Pick the donut with more jelly." or "Pick the donut with less jelly." Incidentally, why would we pick the one with more jelly or less jelly in the first place?

The behavioral judgment would be made according to the purpose-means direction (direction of value) of the doer and it will direct the hand to choosing one of the jelly donuts. Let us use Fig. 6-6 to make the 'purpose-means direction' more clear.

**Fig. 6-4 DTCN/DTC/LCC trade work sheet Format**

DTCN/DTC WORK SHEET				R'qt Check	Basic Func.	Ideas creation	Ideas com- parison	Eva- luation	Judge	Agreed by			
			Sch.Plan								Leader	Cost Gp.	Chief
			Act.Date										
WBS Name					WBS No.			Theme					
Target cost			Idea matrix						Plan A	Title			
			Type	Components	Materials	Mfg.ways	Sub-con etc.		(Sketch)				
Cost	Mfg.	M/H											
	Material												
	Total												
Reliability		Kg											
Maintainability													
Weight													
(Other Requirement)							Explanation of contents and its distinctive character						
<u>Notice on estimations</u> The estimated value of differences only is acceptable.							Cost Estimation (Average evaluation cost per XXX A/C)		Mfg.M/H (        H)		Material		
Trade-off graph weight & cost.  <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">             Unit Cost ↑         </div> <div style="border: 1px solid black; width: 300px; height: 150px; margin: 0 auto;"></div> <div style="text-align: center; margin-left: 10px;">             ↑ LCC         </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Plan A</span> <span>Plan B</span> <span>Plan C</span> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="text-align: center; margin-right: 10px;">             Weight ↓         </div> <div style="border: 1px solid black; width: 300px; height: 150px; margin: 0 auto;"></div> </div>							Eval.Item	Wt.Coef.	Estimation	Ranking	Poin		
							Cost		\$				
							Weight		Kg				
							Reliability						
							Total						
Schedule & Comment													
Evaluation, Comment													
Total ranking													
Selected Idea		General comment & Conditions of selection											



<b>Approved by</b>			<b>Person in charge</b>			<b>Revision</b>				<b>Page</b>
<b>Planning</b>	<b>Purchasing</b>					<b>Drafted by</b>				
			<b>Control Number</b>			<b>Reviewed by</b>				
						<b>Approved by</b>				
			<b>Basic function Expression</b>							

		<b>Plan B</b>	<b>Title</b>			<b>Plan C</b>	<b>Title</b>				<b>Sign column</b>
		(Sketch)				(Sketch)				<b>Drafted</b>	
										<b>Checked</b>	
										<b>Approved</b>	
										<b>Agreed</b>	
		<b>Mfg.M/H ( H)</b>		<b>Material</b>		<b>Mfg.M/H ( H)</b>		<b>Material</b>		<b>Drafted</b>	
<b>Wt. ✖Point</b>	<b>Estimation</b>	<b>Ranking</b>	<b>Point</b>	<b>Wt. ✖Point</b>	<b>Estimation</b>	<b>Ranking</b>	<b>Point</b>	<b>Wt. ✖Point</b>			
	\$				\$						
	Kg				Kg						
									<b>Checked</b>		
									<b>Agreed</b>		

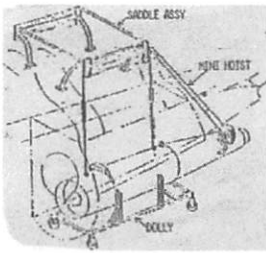
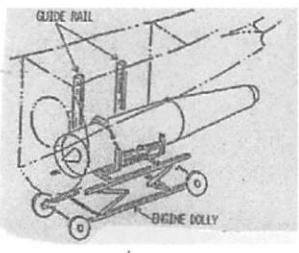
						<b>Chief Eng.</b>		<b>Sub-Chief</b>		<b>DTC suport</b>	

Sign

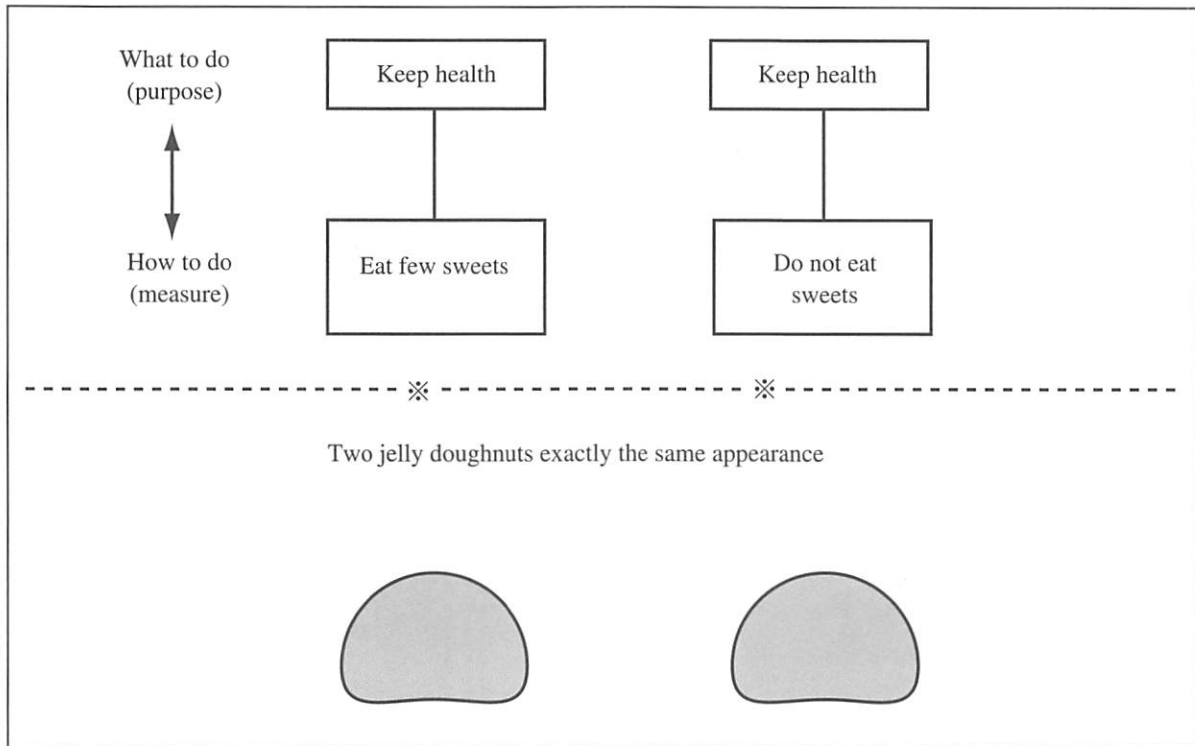
Fig. 6-5 Format of DTCN/DTC/LCC Trade Work Sheet (Filled Example) (Filled money)

DTCN/DTC WORK SHEET			Person in charge	Make Req.	Identify Fun- ction	Create Idea	Make Compar. Plan	Con- firm	Eva- luate	Judge	Agreed by			
			Sch.Plan									Planning	Purchasing	
			Act.Date											
WBS Name Final Ass'y and Installation					WBS No. 2000			Theme						
Target cost			Combination of Ideas						Plan A	Title Sling system (A)				
Cost	Mfg.	H TYEN	<ul style="list-style-type: none"> <li>• Sling Sys (A)</li> <li>• Sling Sys (B)</li> <li>• Lift-up Sys(C) (one door)</li> <li>• Lift-up Sys(C) [Fixed Cowling]</li> </ul>	<ul style="list-style-type: none"> <li>• Guide Ring</li> <li>• Doubler</li> <li>• Cover</li> <li>• Fitting</li> <li>• Guide Rail</li> <li>• Roller</li> <li>• (Mini Hoist Dolly)</li> </ul>										
	Material													
	Total													
	Reliability	Kg												
	Maintainability													
	Weight													
(Other Requirement)									Explanation of contents and its distinctive charactor					
Notice on estimations The estimated value of differences only is acceptable.								Cost Estimation (Average cost per XXX A/C)		Mfg. Cost ( 96H) 474 TYEN		Mat'l Cost 335.6 TYEN		
Trade-off graph weight & cost. 								Eval.Item		Eval. Amount	Ranking	Point		
								Cost		809.6 TYEN	1			
								Weight		4.0 Kg	1			
								Reliability		—	—			
								Set/Remove Timing		Set 33M/ Remove 29M	1			
								LCC(7500 H)		2820 TYEN	1			
								Total			4			
								Schedule & Risk etc.						
								Evaluation, Comment						
								Total ranking						
								1						
Selected Idea								General comment & Conditions of selection						
Plan A														

data are rough data for comparison purpose only)

Approved by			Group in charge		Revision	A	B	C	Page 1/1
Mfg. Plan'g	Proced/Plan				Issued by				
			Control Number		Reviewed by				
					Authorized by				
			Basic function expression						
Plan B		Title Sling system (B)		Plan C	Title Lift-up sys. C' : One door C'' : Fixed cowling		Sign column		
(Sketch)				(Sketch)				Drafted by	
The same as draft A except followings (Merit) One hoist operation. (Demerit) Some problem by setting saddle assy. On the airframe.				Lift up engine by dolly, then set it on aircraft. (Merit) · Stable supporting system · No need to climb on airframes. (Demerit) · Some problems on working. [Too much adjust elements for posit on setting engine, too small space between engine & wing & MLG when moving under the aircraft] · Must change fix cowling to on-off type or to one engine door.				Matsuura 27. April '82	
Mfg. Cost ( 155H) 766 TYEN		Mat'l Cost 140.5 TYEN		Mfg. Cost (C':201 H/C:294 H) C':993/C'':1453 TYEN		Mat'l Cost C':354.7 C'':378.0 TYEN		Checked by	
2	Eval. Amount	Ranking	Point2	Eval. Amount	Ranking	Point2	Approved by		
	906.5 TYEN	2		C' 1347.7/ C'' 1831TYEN	3/4		K.Nakao		
	4.4 Kg	2		C' 8.0/ C'' 2.6Kg	3/4		Drafted by		
	—	—		—	—		Sengoku Matsuura		
	Set 39M/ Remove 35M	2		Set 60M/ Remove 50M	3/3		Checked by		
	3450 TYEN	2		7570 TYEN	3/3		M.Ido T.Abe		
		8			12/14		Approved by		
The medium case between A & C				The inferior case to A & B				K.Nkao	
2				3				Agreed by	
Adopt draft A because of overall excellence for cost, set/remove time, weight and L.C.C. There are some yawing, etc., at the engines slinging time. And need to stop yawing manually, but that is no problem				Chief Eng.		Sub-Chief		DTC suport	
				K.Isozaki		N.Nakayama		M.Esaki	

**Fig. 6-6 The relationship between purpose and measure**



As indicated in the diagram, on the basis of "maintaining one's health" (purpose) the action judgment of a person going to select a donut will stretch their hand towards 'adonut with less jelly' in order to "Avoid as much sweets as possible" (means). On the other hand, a person whose health is not an issue and loves sweets, will naturally choose (behavioral judgment) a "donut with more jelly."

For people to make behavioral judgments, the following are necessary. ① difference in information through comparison and ② the purpose and means relationship (direction of value).

Fig 6-7 shows this in detail. As indicated by Fig 6-7,

- (1) In order to conduct "behavioral judgment ①", it is necessary to have "the "vector comparison of the purpose and means (direction of value) ③ and information of difference ④ ". Thus,
- (2) "vector ③ of the Purpose and Means relationship" is needed. And,
- (3) "Information of Difference ④ " is needed to compared that vector.

Also,

- (4) In order to obtain "Information of Difference", "Performance comparison ⑤ " is needed.
- (5) To conduct a performance comparison, it is necessary to "compare 2 or more proposals or establish 1 standard ⑥ " . (Note: deciding whether or not to eat the jelly donuts will create 2 more proposals)
- (6) And, when "behavioral judgment ① " is decided, automatically "action or thought activity commencement ⑦ " is conducted.

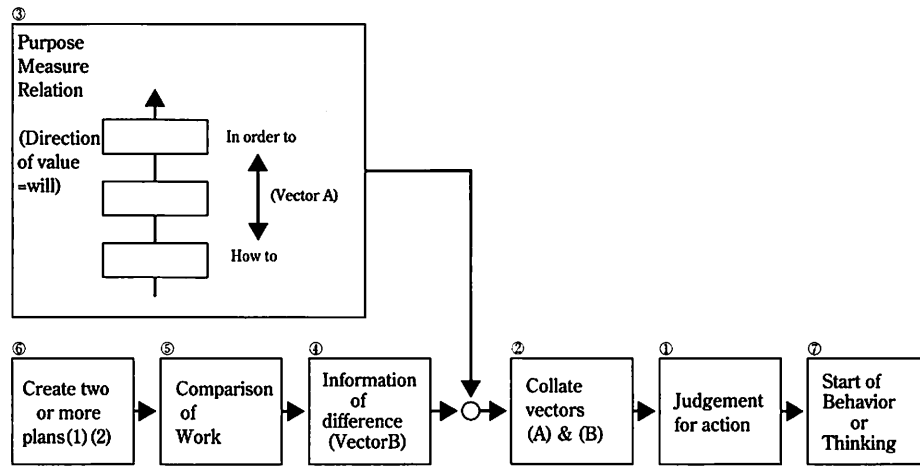
Thus, in the example of "which donut to eat or not to eat", a series of thought activities arrives at a behavioral judgment decision. It can be concluded that when trying to do something, in order to conduct an exact behavioral judgment it is absolutely necessary to have at least a "direction in the information of difference" with respect to the "direction of value or will (vector) of the person conducting the behavioral judgment" so that it can be compared with something, whether it be positive or negative.

Fig. 6-8 is a PMD of the components from Fig. 6-6 & 6-7, which have been rearranged vertically in a purpose and means relationship. When reading the cards from top to bottom or with a purpose and means relationship, in order to "How to go about doing it" (verb with noun), "How to go about doing it" (verb with noun), it is evident and absolutely necessary that one must first make a "purpose and means relationship (direction of value vector)" and to "compare 2 or more proposals or establish 1 standard " to have an action or thought activity start.

In addition, as already stated in Chapter 1, if this Purpose Measure Diagram is generalized, it will become Fig. 6-9.

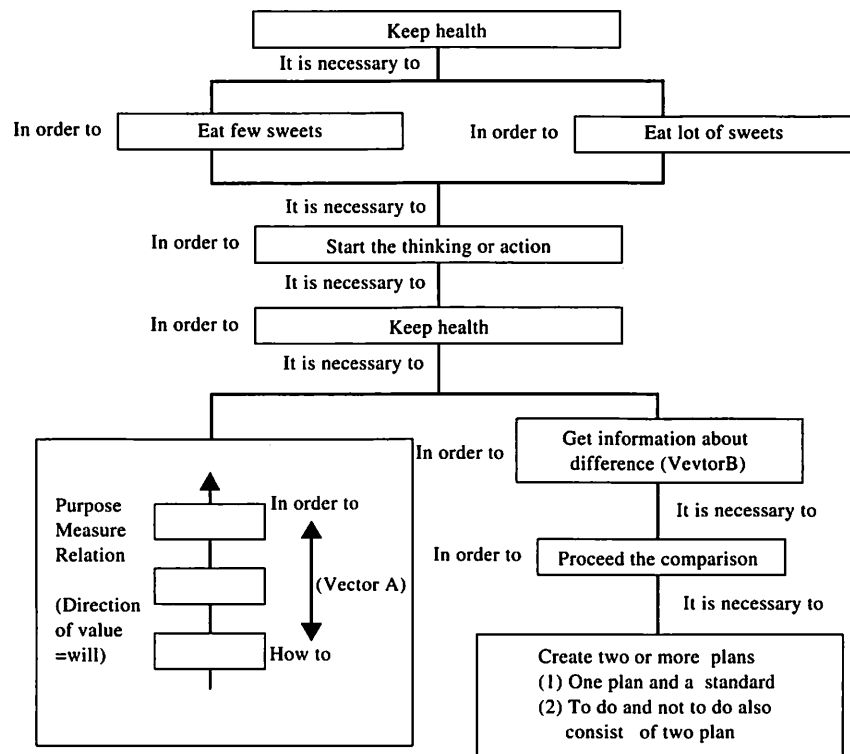
Again, with the risk of repeating myself, it can be understood that by reading this diagram from top to bottom, it will become the "mindset" expression indicating the purpose and means relationship, and by reading it from bottom to top, the relationship heading towards the result of the purpose, that is, a rough "procedure (or a condition level in order to realize the purpose)" is expressed. The "Method of Creating Wisdom from Knowledge" is such a theoretical structure.

**Fig. 6-7 "Flow chart of the process and mechanism of the behavioral judgment through Information of Difference" (Jelly Doughnut Theory)**

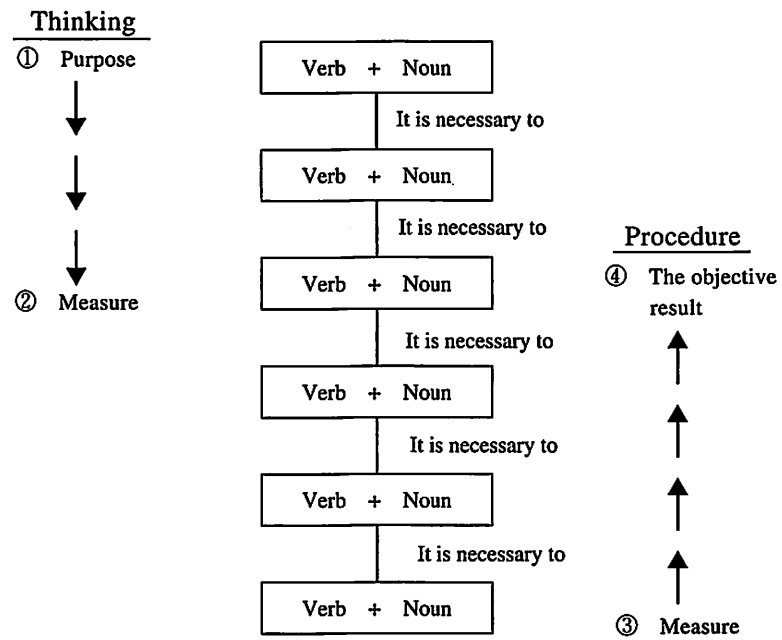


- (1)One plan and standard also consists of two plans.  
 (2)To do and not to do also consists of two plans.

**Fig. 6-8 A diagram which has rearranged the flow chart Fig. 6-7 of the behavioral judgment mechanism into the purpose and means vertical relationship.**



**Fig. 6-9 Mindset and its means**



## **Six conditions for the behavioral judgment**

Which jelly donut to choose is an extremely easy action pattern. And so, as long as the Direction of Value and Information of Difference is understood, then that person's behavioral judgment can be determined.

However, for tasks with a more complicated component or behavioral judgment during the problem solving process, that is, making the appropriate judgment and to conduct it swiftly in management, it is necessary to attain the information of difference to simultaneously judge in the direction of value. Thus, the task "necessary conditions of the behavioral judgment in management" was established and the PMD was created. This is shown in Diagram 6-10.

As already understood in Chapter 1, the specific items under the bold framed MAIN KEY WORD indicate the direction of value and the ideal behavioral judgment and necessary conditions. And what this diagram specifies is that 6 conditions are required to conduct a behavioral judgment.

I call these components the "six conditions for behavioral judgment". I will explain this by referring to the diagram.

Block No.1: indicates the direction of value.

Block No.2: As to "create proposals for comparison", in order to create an information of difference for comparison, 2 or more proposals are made. The necessary condition of \_2 (a combination of the criteria proposal and 1 or more proposals) is such that this proposal must have feasibility.

Block No.3: What is "create a matching-time point characteristic for the comparison"

The matching-time point characteristic is such that even if it is the same \$10 bill, the bill from the present has a different significance to the bill of the future. This means that if next year's bill is brought to the present, a year's interest rate must be contrasted (if the interest rate is 10%, then  $\$10 - \$1 = \$9$ ).

Block No.4: What is "Put weight on the comparison components"?

For instance, in the case of finding employment when one is choosing from 2 or more candidate companies, a comparative study of the components such as the scope of the company, name awareness, company climate, salary, etc., are conducted. However, when evaluating the components, weight is given or distributed differently among them. That is, an importance



coefficient is allotted to each component. For example, 1, 2 or 0.5 may be allotted to the scope component. If company A has 80 points for its scope, with a level of importance of 0.5, it will have only 40 points overall. It was indicated in Blocks No. 3 and 4 to arrange it so that the object of comparison could be compared at the same level.

Block No5: What is "obtain the 'real information' which is the object of comparison"?

What is meant by "obtain the 'real information'" is that compared to the information acquired directly, information from indirect sources such as 3rd parties or the mass media are biased. Moreover, active information, which is information acquired with a purpose and passive information have a difference in quality and speed. Real information indicates the bias-removed information or true information.

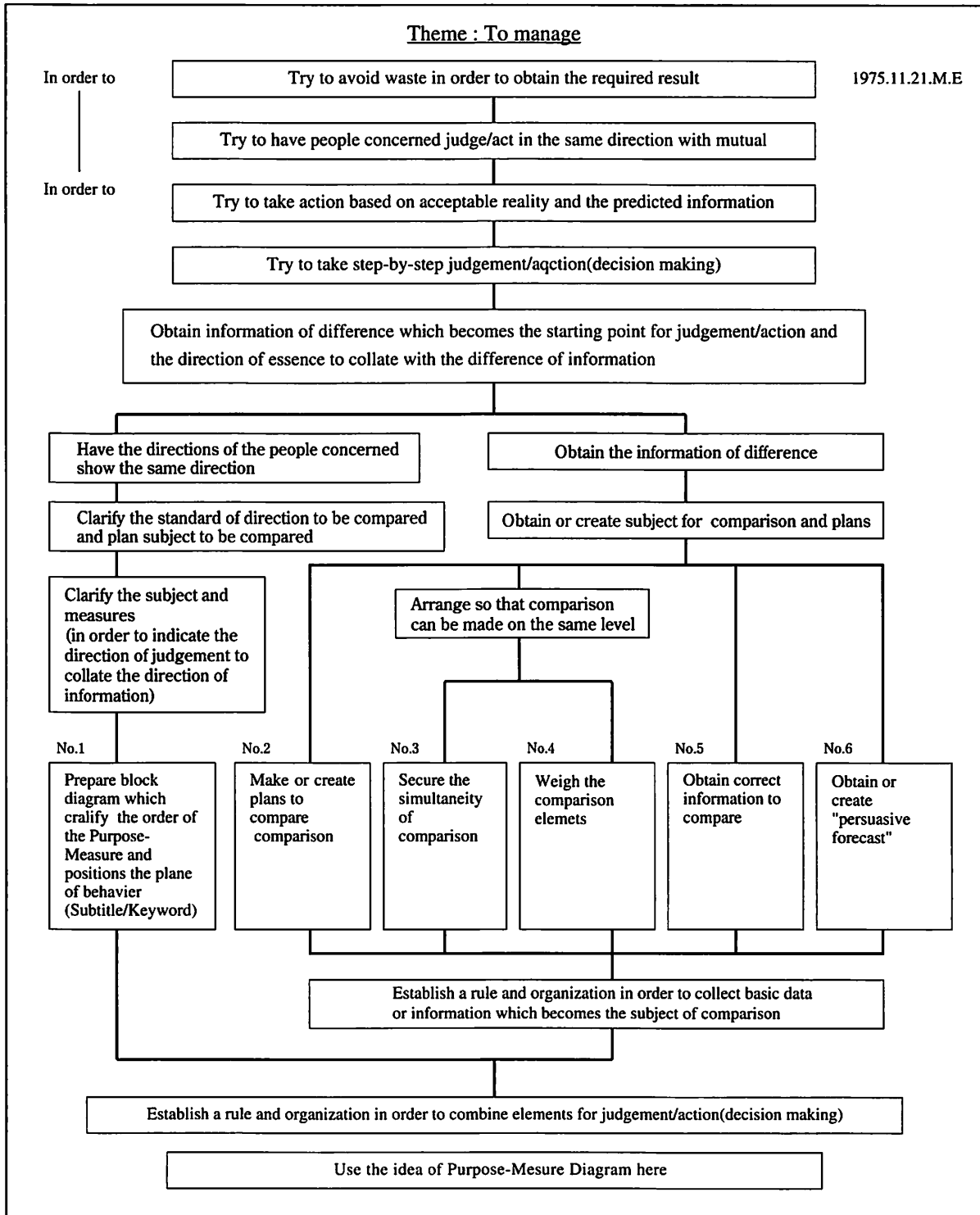
Block No.6: What is "obtain an estimation with persuasiveness or make it"?

What is indicated here is not whether an estimation will come true or not. Estimations are uncertain things, sometimes they are correct, other times they are not. When behavioral judgment is conducted, what is necessary is to have a sense of whether the estimation will come true, whether it has persuasiveness. This is because even if an estimation proves to be true (looking at the results), if it has no persuasiveness, it will not be adopted.

As can be seen from the above, Block No.1 indicates "direction of value", Blocks No.2 to No.6 indicate the obtaining of "information of difference" along the direction of value. Thus, in management, to conduct behavioral judgment reasonably and promptly, it is necessary to "first, realize the upper level purpose, several purpose and means diagrams are created at every opportunity," and "in order to facilitate the behavioral judgment, the contents of the component items indicated in Blocks No.2 to No.6 are to be obtained or made."

**Fig. 6-10 Essential conditions for making decisions in management**

Purpose-measure diagram shows six required conditions for decision-making in management



## **Column 2 : Until the "Method for Creating Wisdom from Knowledge" arises**

### **The information of difference is a factor of the action decision.**

I had pondered from the past, "How do people conduct behavioral judgment?" While I was busy at work, with such a vague question on my mind I came to realize that in order to make research and development management effective, one only needs to avoid doing unnecessary things. In order to do that, it is only necessary to clarify the input and output relationship. As a result, I designed the Steplist prototype indicated in Chapter 3. However, in order to move from one Steplist phase to the next, judgment and decision must be conducted.

I was then burdened with the question of how does one acquire a rational judgment in order to move to the next phase? After much thought, the following came to me. I realized that if a judgment was asked of a superior and when there were 2 proposals, the answer or approval was given rather quickly. So, I kept asking myself what it meant to have 2 proposals.

Then I realized that "to have 2 proposals means that both may actually be adopted, or both proposals can be realized". It also means that within these proposals, there is none that cannot be realized, and therefore the two proposals can be compared. Thus, I reached a conclusion that "2 proposals are to be compared" and "a difference is needed for comparison".

A proof of this is shown by the fact that if we were to select a product by its price, we mainly look for the difference in the price. I realized that the information of difference is a definite factor of the behavioral judgment. The Information of Difference is related to the relationship of the Purpose and Means. Then, "What does difference mean?" My quest continued.

Back then, I was gaining weight and my doctor told me, "Refrain from sweets." It was necessary to maintain my health. Then, it dawned on me. Information of difference means a difference such as "in order to maintain one's health, refrain from sweets" and "in order to maintain one's health, take in much sweets". Thus, this was how the Purpose and Means was related to the Information of Difference.

On the other hand, I wrote "When I try to do something, what I am trying to do" on cards, arranged them according to a purpose and means relationship and decided to examine them. By doing this, I realized that the focal point was easily discerned and around the middle level, a card with an expression indicating the focal point was usually present.

In addition, it was the following passage from "Value Analysis for Better Management" written by

W.J. Ridge (1969) that caused the development of this method. That is, according to the presentation of the research results, when doing something, if one asks "Why?" and "How to go about doing it?", the most appropriate expression can be found.

Here, I thought of how to make this more tangible, usable for the Japanese. After much consideration, I came up with, "In order to do what, How to go about doing it." And this is how the mechanism of the behavioral judgment began to be understood, and the PMD (Purpose Measure Diagram), which attains knowledge to grasp the correct purpose means relationship, was born.

## **Chapter 7 Implementation Plan for Task Realization**

### **Implementation Plan Document necessary for task realization**

In order for an organization to realize a new purpose, it goes without saying that the framework and procedure must be decided, agreed/settled, and acted upon as an order from the organization. To create that framework and procedure it will be the "Implementation Plan" discussed in this chapter.

Conventionally, what is known as the "Plan Document" is the coexistence of the implementation plan (indicated by the procedure and framework), the concept and finance plan. Therefore, it becomes necessary to constantly review and replace the contents, and after a while it becomes difficult to discern up to what part is preserved as the regular plan. To make up for such a flaw, the Implementation Plan indicated here will clearly distinguish and treat the following 3 documents. That is,

- ① The "Implementation Plan" that indicates the procedure and the framework which do not change much if it is first decided.
- ② The work of the "Creation Document" or "Concept Document" that changes by the addition of some opinions or with the progress of activities. These are the work phase of the Implementation Plan which change after being outputted, and they change after passing through the phases of Concept Document → base map → scheme drawing → manufacturing diagram → field assembly.
- ③ The "Financial Plan" which changes if necessary according to the conditions of the step modification or Basic idea proposal, schedule, etc. Thus, by independently treating the 3 documents the Implementation Plan, Creation Document and Financial Plan, it solves the problem of the trap that Planning Documents were prone to fall in.

This chapter deals with the Implementation Plan. Although this method has already been implemented and can be seen in systematic planning management in organizations or corporations, I will discuss below how it can be easily understood and used effectively.

#### **1. What is the "Implementation Plan"**

The Implementation Plan's range of use

Before we look at what makes up the Implementation Plan, let us make clear what kind of state requires it.

- (1) We saw in Chapter 5 that the 3-5 Phase Improvement method is used to improve the current state of things. It was stated that for improvement, there was the breakdown of PHASE I to PHASE V and firstly, an improvement (Implementation Plan) which indicates the framework and procedure is made and carried out after receiving the approval of the head of the organization (Diagram 5-2). And among them, Phase III requires the Implementation Plan including the Steplist to be made and activities advanced. This is because the improvement measures of PHASE III become the development activities "Implementation Plan". And since it is extremely close to the development work stated in the following.
- (2) Like work in development, in order to progress activities in stages and realize purposes, the Steplist, which establishes the framework of the phased decision making, and the Implementation Plan that indicates the organization in order to implement it, will become necessary. That will be the "Implementation Plan" discussed in this chapter.

In this way, the "Implementation Plan" not only makes up for the faults of current Plan Documents, but it has an active significance.

### **PHASE-3 Measures (for development) Components of the "Implementation Plan"**

As to what is an "Implementation Plan", one pattern will be indicated. Refer to Fig. 7-1 and 7-2. Fig. 7-1 indicates the cover of the "Implementation Plan", and Fig. 7-2 indicates the component of the table of contents.

Moreover, in order to summarize the Implementation Plan onto 1 page and make it easily understood, it is convenient to use the "Implementation Plan Schedule format" indicated in Fig. 7-3 as a supplementary format.

Fig. 7-1 Cover of Implementation Plan

Fig. 7-2 Table of contents of Implementation Plan

Fig. 7-3 Implementation Plan (activity schedule bar chart)

**Fig. 7-1 Coverpage of implementation plan (example)**

Document number	
-----------------	--

○○○ development

Implementation plan

Supplier's  
approval sign

Approval	Agreement	Check

Revised date  
Established date

Approval	Check	Create

×××Co.,Ltd.

**Fig. 7-2 Example of contents of the Implementation Plan Document**

**Table of contents of the Implementation Plan Document (procedures and the organization are indicated).**

1. Purpose of this document (Write that this document is to establish the organization and procedures of the implementation).
2. Purpose of the implementation plan (Indicate why and what will be done.).
3. Statement of principles (State using the expression "To do ...").
4. Related /referenced documents
5. Purpose and the conditions (Establish the fixed fiscal year price when the cost is involved.).
6. Organization (Put the designated personal name here, and conduct the improvement revisions).
7. Phase breakdown of development (Indicate by Steplist).
8. Principle of each phase activities (Write the essentials of the Steplist description.).
9. Interim report contents
10. Format usage
11. Work schedule bar chart

Attached annex:

Verification/evaluation procedure document. (Make this document if necessary. )

Attachment:

Implementation Plan Document supplement

1. PMD
2. Objective article (of things and systems)  
WBS (Clearly indicate the range of the article).  
(Note: This WBS may be placed between 4 and 5 of the above-mentioned. )
3. Others



Fig. 7-3 Implementation Plan Sheet

SUBJECT

Date:

Coordinator

Manager

Dept chief

Division

Detailed process items and/or its contents

Lot scheduled serial or Lot Number

Target

Implementation plan schedule

Personal concerned and assigned

Necessary conditions and notes to attain the object

Results of adjusted conditions

## **2. Creation procedure of the "Implementation Plan"**

### **Procedure**

The creation procedure of the "Implementation Plan" will be explained according to Diagram 7-2.

- (1) The creation procedure is made according to the sequencing of the table of contents indicated in this diagram.
- (2) After making the pre-draft of the Steplist for the "Phased breakdown of development" listed on the 7th item of the table of contents, the essentials of the contents of each step of the 8th item are written down. Then, by the act of writing, points of the contents where amendments should be made will come to light. As a result, the contents of the Steplist will be amended.
- (3) Following this, the "Activity Schedule bar chart" of the 11th item in the table of contents is made. Then, it will be known if the contents of the Steplist, writings of each step and the schedule bar chart are launched before, in parallel, etc., and a point of contact will be made to create a mutual consistency.

Therefore, by adding to the Steplist contents or to the layout of the table of contents, a well arranged "Implementation Plan" will be smoothly made. Through these procedures, the "Implementation Plan" will be completed, but it cannot be executed immediately. There is a problem of approval.

### **Particulars are indicated on the cover for approvals.**

In approvals, there is an important point so as not to make problems in the future. In fig. 7-1 the cover for the Implementation Plan was indicated, but what is important here is to keep promises as indicated below and to manage maintenance responsibly for the Implementation Plan contents.

#### **The written particulars**

- ① Decide on the creation of the Implementation Plan and the secretariat which will overlook maintenance (in the beginning it suffices to have temporary office, but finally a formal secretariat)
- ② Obtain document number (The maintenance supervisor of this number should be someone from

administration or a clerk in charge of general affairs).

- ③ The chief executive in charge of the Implementation Plan approves the document.
- ④ Insert the signature of agreement signed by the head of the related organization after the cover page (make the agreement signature column large and establish an agreement space for the head of the next organization)
- ⑤ When the head of the organization, team leaders, etc., change, the predecessor or the next person in charge must sign and date the above page and maintain and revise. The responsibility of succession is assumed to be both the predecessor and successor's joint responsibilities. Therefore, until the successor's signature is added, it will be interpreted that the predecessor's agreement details and instructions are still in effect. When you want to change the interpretation, the revision of the document or instruction is added.
- ⑥ Who made it, who approved it and when was it approved are specified on the table of the revision page which is the second page after the Implementation Plan cover.
- ⑦ The overall person in charge of maintenance and revision will be made the person in charge of the Executive Office as indicated in the Implementation Plan.

### **3. Framework of the organization**

When a conventional organization embarks on something new, it is extremely rare to have it go into action quickly. Especially when conducting something completely new or a reform on a large scale, there is sometimes sabotage (even if it not made public). To do away with such acts and aim for the realization of the task, an effective way is the RO (Root Organizing) method presented here.

Although many researchers and businessmen in organizations are making deep observations and suggestions in regard to an effective and efficient organization reform, this RO method was born based on my practical experiences. If the organizational framework is such that it has a mindset of making a task team for each theme when necessary, it would follow the RO method. However, organizations that are slow to change even though they know that it is beneficial can be coordinated by the mechanism indicated by this method.

The origin of this RO name (Root Organizing) comes from an American who used this name to evaluate the aggressive laying of the groundwork by Japanese organizations. As to what kind of organization it was, it was similar to the configuration of Fig. 7-4.

#### **Management of an RO organization**

The following points show how this organization is managed.

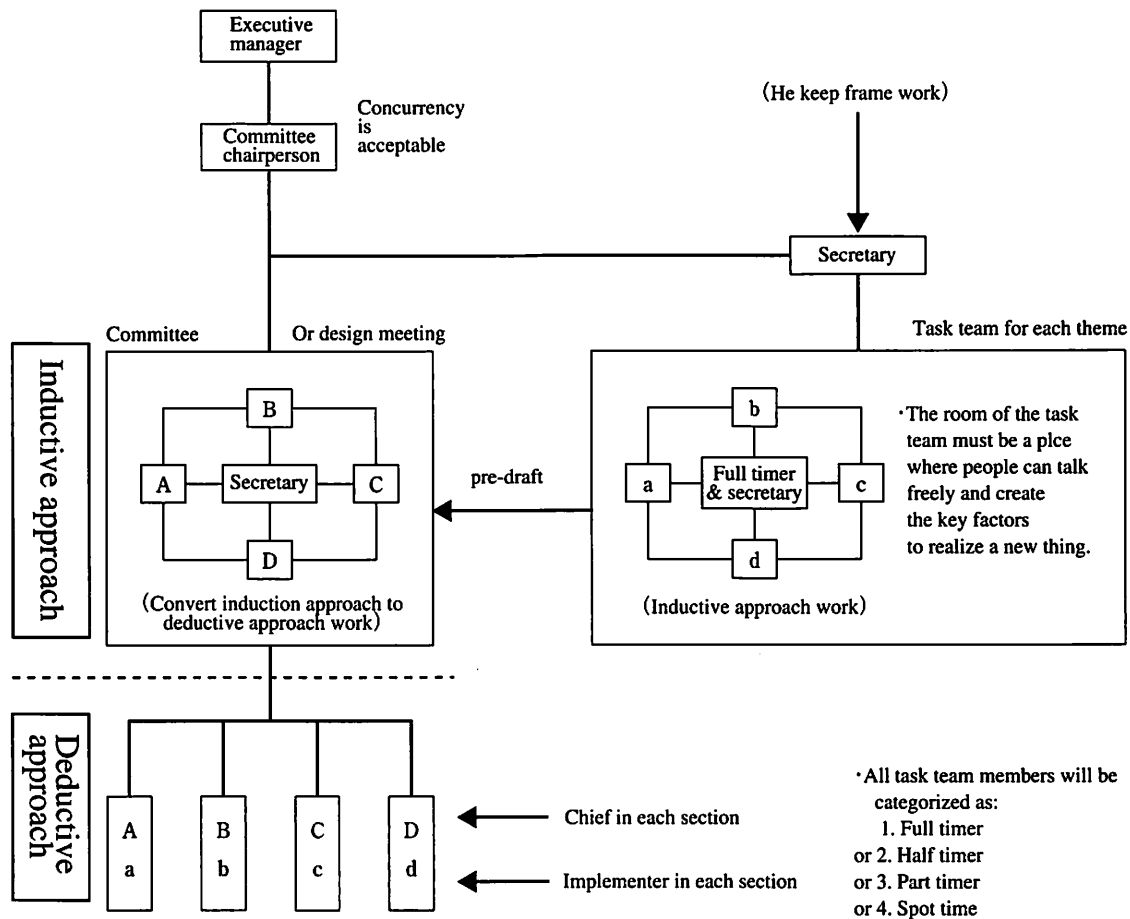
- (1) The task team is organized for each theme by the full-timer, part-timer, spot-timer who are the representatives of the secretariat and each staff organization. A spot-timer is a central on-site figure who busily works daily and cannot participate in the task team all the time. However, this person's opinion has weight and so such individuals are made to participate on the spot (when making the first PMD, these individuals are made to participate).
- (2) The "pre-pre-draft" (basic plan) is made by the task team, and based on this basic plan the people in charge of the staff organization coordinates the making of the "pre-draft" (the approach here corresponds to the induction approach of the Steplists).
- (3) The "pre-draft" is then handed over to the committee members and made into a "draft".
- (4) A committee meeting is held within the organization and the "draft" is approved by the head of the organization. That is, when the procedure and framework is in agreement which becomes a full-scale instruction for the new activity, it is decided on. The instructions will be given.

The locating and sequencing breakdown of the "pre-pre-draft", "pre-draft", "proposal", and "approved" are indicated in Fig 7-5.

- (5) Therefore, the agreed and approved "Implementation Plan" becomes the directive of the organization.
- (6) Even in regard to the output which is made according to the Implementation Plan (for example, approved diagram), it is convenient if it is handled and embodied with the mindset of Fig. 5-5 with the "pre-pre-draft", "pre-draft", "proposal", and "approved" breakdown. Even in the case of the commonly exchanged "approved drawing", "scheme drawing", etc., between the purchasing department and suppliers, if the words "pre-pre-draft", "pre-draft", "proposal", and "approved" are marked on the back, then the confusion of the naming of conventional drawings, its interpretation and location can be avoided.
- (7) The contacts for receiving opinions from external and internal sources are to be narrowed to this one contact.
- (8) Moreover, the secretariat takes charge of the overall schedule promotion and prior to each planned date, one month, one week and two days before, each person in charge are asked what the prospects of the activities being completed as scheduled is like, and if the activities are proceeding as scheduled, the secretariat has the power to gather the parties concerned and hold a procurement meeting to carry out discussions.

With the RO organization, by combining the 3-5 Phase Improvement and "Implementation Plan", it facilitates the advancement of the organization with respect to new activities. Or, the organization can be made to move if it soon comes to a standstill or has the tendency to heed no concern for the new activity.

**Fig. 7-4 Root organizing (RO)method:  
( In simpler terms, a framework for the groundwork and implementation)**



**Necessary conditions:**

1. It is necessary to lay the groundwork with the staff organization..
2. Specific opinions can be made as long as the basic plan is made. Moreover, the discussions start.
3. When a good question is raised, a summarized answer returns.
4. When the basic plan is typed into a word processor it facilitates viewing and opinions can easily be inputted
5. An embodied proposal is made in the order, "Pre- pre-draft" → "Pre-draft" → "Proposal" → "Approved"
6. In a small organization, A, a, B, and b may be the same individual..

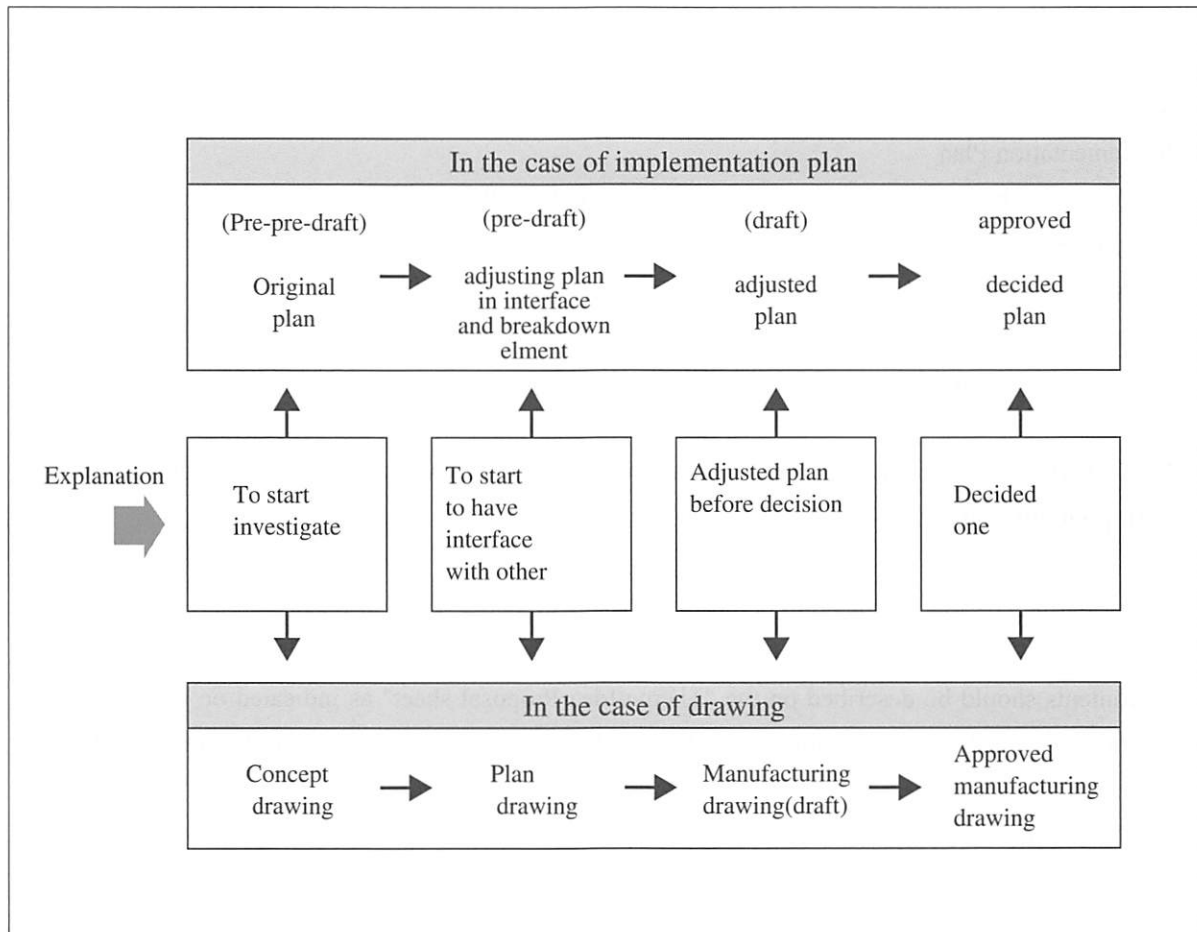
**The role of the a, b, c, and d members are**

- ① Full-timer (Writes the basic plan, types it into a word processor.)
- ② Half-timer (supports the full-timer )
- ③ Part-timer (supports the full-timer )
- ④ Spot-timer (central figure on-site , busily works daily and cannot participate in the task team all the time).

**The secretariat plays the following 4 roles**

1. Makes and keep the framework
2. Sets up a task team for each theme and makes a basic plan (pre-draft) by the induction approach
3. Holds discussions based on the proposal, and set up the design conference or committee to allow for decision making.
4. Becomes the sole contact for receiving external and internal opinions.

**Fig. 7-5 Categorizing of pre-pre-draft, pre-draft, draft, approved one**



### **Column 3: Additional fundamental principle included in the Implementation Plans**

(This is the wisdom accumulated by the author over 36 years of corporate life and experience from working in 32 departments.) The principle and the format for realizing it should be indicated in the Implementation Plan.

By using this revolutionary "Method for Creating Wisdom from Knowledge", from the embodiment of small things and systems to the materialization, construction and development of colossal systems will become possible in an orderly fashion. However, in this process it is a matter-of-course to have the necessary conditions for avoiding faults or risks. The format indicated on the next page is to be used for accomplishing this.

#### **1. First of all, the following points must be included in the fundamental principle of the Implementation Plan.**

- ① For particulars that that need to be proposed/suggested now before it becomes too late to allocate time for its consideration, no matter how trifle something may seem, when one realizes it the contents should be described on the "Theme/Idea Proposal sheet" as indicated on the next page and it should be an obligation of all the people concerned with the project to present it to the secretariat.
- ② The contact should be the secretariat that has been narrow down to one place by the Root Organizing (RO) method .

#### **2. Concrete examples of using the form would be the following.**

- ① Regardless of the difficulties of conveying failures or faults, they should quickly be reported or suggested when they are noticed.
- ② When one notices from the slipstream point of view (system operation phase or disposal phase) that certain particulars, themes or ideas must be considered.
- ③ When one wants to record for future reference the particulars that must be considered in the operation phase/ disposal phase, if one were to take action now.
- ④ When countermeasures should be considered or when concrete plans are noticed after clearly pointing out what the potential risks or problems are.
- ⑤ When one recognizes that although others may be in-charge of a certain field, from one's own knowledge and experiences in order to realize the purpose or task, one's opinions should be



voiced so that it will be remembered during the consideration period even if it may be thought of as meddling in other people's affairs.

- ⑥ When one realizes that the knowhow is not being passed down to the successive generation of co-workers (The Theme/Idea proposal sheet is used as a format for succeeding the know-how from senior workers or predecessors.)
- ⑦ During business, when the parties concerned realize that something should be taken up, it is to be described and proposed. Seizing this opportunity, things that are considered to be tacit knowledge (both implicit and tacit) are to be all written down (A concrete example of 'implicit knowledge' is knowing the need for following earthquake-proofing building codes for structures in Japan, but not following such codes in say Calgary, Canada. In the case of 'tacit knowledge', it indicates what is already known in one's heart or mind, but has not yet been expressed clearly.)
- ⑧ When one in design or manufacturing is too busy or is not good at describing things or drawing caricatures, someone from the secretariat's task team is to do it in place of them (For this to happen smoothly, one must go around the worksite and ask, "Is there anything that you are concerned about?")
- ⑨ When one experientially feels that a different perspective should be taken in the development or construction process (Realization occurs when the person in-charge of the secretariat or someone from the upper management always walks around and keeps their eyes and ears open at the worksite.)
- ⑩ Using the Theme/idea proposal sheet form as a proposal sheet for task proposals or when running a campaign.
- ⑪ When a PMD is created, the form is used to describe the footnotes of the written expressions or as a format for the explanations.

### **3. Important points and supplemental particulars**

- ① Unlike the conventional improvement proposals, it is not necessary to write the problem points on the Theme/Idea proposal sheet, but may be expressed as, "... method needs to be done," or "Only ... needs to be done."
- ② Although concrete measures are needed in the end, to create them a pre-pre-draft of the Theme/Idea is also acceptable.

Format writing point

- ① Write the review period allocation and flow instructions after receiving the proposal.
- ② Write what the task is for (only the task name proposal is acceptable).
- ③ Write the title for what the proposal is for.

① ACTION

→

→

→

→

② ( ) Theme/idea proposal sheet		Registration number date proposed				
③ Write the theme name here what the proposal is for. (※)	organization/affiliation	Year/Month/Day				
		proponent				
		TEL;				
		FAX;				
E-MAIL		Write here at what phase the review period should be allocated to				
Name of Upper-level system or WBS No. and the title (Write what part of the system it is related to here.)	Phase	I	II	III	IV	V
	Review Period					

1. Theme (proposal) / Idea (※) (attach a sketch if necessary)

1. Recognition Particulars

Here , it is acceptable to write what should be done to the theme or idea. In any case, the details of what should be reviewed are to be written.

The procedure for the review may also be included. It is the secretariat's responsibility to think about the procedure , etc.

2. The principle behind it is found in the FBS explanation that entering creation from the theme rather than the idea yields a broader and deeper result.

3. In this area, firstly, write what should be done and not the problem points. If necessary, write the knowledge and recognition that is needed.

4. According to the proposal, problems that disappear are to be written in the following Aims of the Proposal area of item (2.). That is, from the perspective of The problem points will disappear if only is done.

2. What area the Aims of the Proposal (expected results)

1. As a result, what can be done, what problem points will disappear or what results can be expected are written here.

### 3. What are the conditions necessary for realizing the proposal?

1. Write the necessary conditions for realizing the proposal. (For instance, you may write that a PDF should be made by the parties concerned.

### 4. What made you come up with this proposal?

1. By writing this, from where or what made you think up this proposal will be described and background indicated.
2. You may write the situation of when this proposal dawned on you. As for familiar examples, something that would easily give the background images is acceptable.

Results of review	Theme adoption
	Idea adoption
<p>Note</p> <p>1. There is no need to fill all the area. However, it is necessary to write in the areas with the asterisk. (※)</p> <p>2. Make proposals without hesitation of themes or ideas that may already have been recorded.</p> <p>3. The proposal is to be presented to _____.</p> <p>4. This proposal is to be handled according to the DTCN/DTC theme/idea proposals or processing notes .</p>	Defer (until when).
	No adoption
	Secretariat follow up

## **Chapter 8 Summary**

**In summarizing the above, we have the following.**

### **1. Method of indicating direction of Purpose Measure Diagram**

= Method of indicating directions of value and intention.

= Method for building consensus.

According to the PMD method, it is important to express the relationship top to bottom as purpose and means, respectively. It should never be written or organized horizontally from left to right. This is not a process, but a vertical layer with a purpose and means relationship.

### **2. Steplist method = method for creating a Faultless Phased process**

According to the 4-box principle, it is important for each phase to be organized horizontally, running from left to right as an "input and output" format.

### **3. FBS method = an exact method for creating the mechanism and component of things and systems.**

It is organized from top to bottom and the principles are written. Although the function may be the same, it is important to be aware that depending on the idea chosen by the function, the mechanism and functional component of things and systems of the lower level may change.

### **4. RO method = Organizational structure that creates an inductive and deductive approach of the above written 2. and 3.**

Within the same organization, when conducting the induction approach or the deduction approach, the remarks and actions of people may change slightly. Even if it is the same person, different roles can be systematically played. Based on the above framework, the organizational structure creates an organization of the mindset and processes of the PMD and Steplist.

### **5. Implementation Plan method = an integrated method that effectively sets organizations in motion using the above-mentioned methods.**

If a document is made according to the Implementation Plan method and is agreed upon, approved and used as instructions by the organization and related institutions, it will be exactly

organized and its precise process and framework will be created. Of course, a necessary condition is that the secretariat and the head of the organization must conduct a seamless follow-up, and when necessary do periodic review and revision.

**6. There are two types of ideas, the "Ideas of the procedure" and "Ideas of things / systems", and they correspond to the "4-box Steplist" and "FBS".**

The PMD is the functions, works and actions (written in Verb + Noun) of the representation of "In order to", "How to do it". With the risk of becoming slightly technical, when considering the "Process" and what kind of organization framework to work under, the field of Project Management and things relating to the mechanism and component of "things / systems" are in the field of System Engineering. The PMD becomes the necessary "Direction of intention = Direction of value", a common ground for both.

7. Furthermore, a caricature or cartoon having a future output image of the main keyword in chapter 4, paragraph 3, procedure 2 should be drawn out as soon as possible in one's notes or posted on a wall where it is easily seen since this will become the leading factor for the overall success of the project. The reason for this is because the cartoon or caricature having the final appearance of the result tells one subconsciously that something needs to be included and that some means is necessary in order to reach the desired outcome which is found in the image. Then, at every opportunity one will try to gain knowledge and wisdom or from every meeting of individuals try to draw out some form of relationship in order to reach that goal.

#### **Column 4: Why is this book a "Method for Creating Wisdom from Knowledge"?**

If I indicate the relationship of "Have knowledge" and "Have wisdom", it will be as follows.

##### **1. Have knowledge**

"Have knowledge" means it has the following 2 information.

- (1) Information concerning the cause-effect relationship.
- (2) Information about what exists there (including information about its mechanism and component). For instance, information on the cause-effect relationship is to know that, "If I drop a glass cup, it will break." Information about what exists there (including information about its mechanism and component) means to know that a glass cup exists, and to know what kind of material it is made of, its construction, etc.

##### **2. Have wisdom**

"Have wisdom" means,

- (1) to "Have knowledge regarding the process about how something should be done," and
- (2) to "Have knowledge about what kind of results will be brought about and what will happen to its structural component," when the process is undertaken.

For instance, when I want to break a glass, either I will drop it or I will throw it up in the air and let it drop on concrete to be sure of the outcome (process information about how something should be done). Then, in order to shave my beard with the broken glass, I would choose the fragment with an edge that is sharp enough (result and what would happen to the structure component). Thus, although knowledge develops into wisdom, only with the Direction of will and Direction of value will knowledge be rearranged into wisdom, and according to that wisdom action is taken.

I have explained in great length that what organizes the Direction of will and the Direction of value is the PMD, what makes the means into a process is the Steplists and what creatively constructs or organizes the existence or the structural component of things and systems is the

FBS technique.

### **(3) Chain of knowledge**

When wisdom affects the result, the explanation about it that if one were to do this, that would happen, or when it is either explained or passed onto others, it becomes new knowledge and is added to the knowledge that we have already. This becomes a circulation of knowledge, wisdom and the newly attained knowledge.

In the "Method for Creating Wisdom from Knowledge", this circulation mechanism is called the "**Wisdom engine**". From all the above explanations, I believe you have come to know that the PMD becomes the sole KEY SWITCH for making this engine turn.

### **(4) Effective use of the PMD and 4-box Steplist**

The principle where an action direction is newly made by the PMD and procedure by the faultless-phased 4 boxes of the Steplist.

- (1) It was stated that when a PMD is made, if empty boxes appear and are not filled, cards connecting the upper purpose and lower measure will not be embodied. Once filled, they will create an opportunity for acquiring new knowledge or wisdom by creating an action direction.
- (2) Therefore, this becomes an important combination for the effective use of the PMD and faultless-phased 4 boxes.
- (3) From this perspective, if one would reread what has been previously described in the Method for Creating Wisdom from Knowledge, one would understand this effect. That is, if the Steplist is created before the actual start of a project, a faultless-phased simulation can be made showing how to incorporate the important points into the procedure.

## Column 5: The reason why PMDs must be aligned vertically

1 . An important point for creating a PMD is to always write the purpose above and the means below so that a top-down relationship exists. For instance, similar to the English language if the purpose was written on the left-hand side and the means on the right, or the means on the left and the purpose on the right, in regard to the direction of intention and decision making, a completely different shade of meaning of the intention will exist and there are cases where misunderstandings arise. (The existence of this relationship has not been realized in European and American manuals.)

What would happen if the PMD expressions I with the same content are rotated 90 degrees II , 180 degrees III and 270 degrees IV as in next figure?

By using the diagram "Comparison diagram showing the difference in nuance when the PMD is rotated in 90 degree increments" on the following page as a reference, the essentials are explained as follows.

Fig.4-4 compares what shades of meanings become stronger and how a difference in the reading arises when the PMD of the apartment construction and management is rotated in 90 degree increments. That is, based on the PMD where the purpose and means diagram is aligned from top to bottom, respectively, the following differences can be seen.

- (1) First of all, even as it is in the original PMD diagram I , when being rotated 90 degrees, it becomes the PMD II procedure flow. By looking at the relationship (PMD II ) of block No.8 and No.9, in the case of the fundamental vertical PMD I it is such that, in order to" 8. build and operate the apartment house", "9. capitalize on the falling price of construction". However, in the case of the procedure flow II it is such that, in order to" 9. capitalize on the falling price of construction", "8. build and operate the apartment house". The direction of intention of this latter case requires a large investment.
- (2) The fundamental PMD's expression I is such that it makes use of the once or twice in a lifetime opportunity when falling price of construction on the upper purpose "1. get stable feeling in present and future", the direction of intention is strongly expressed. Thus, the

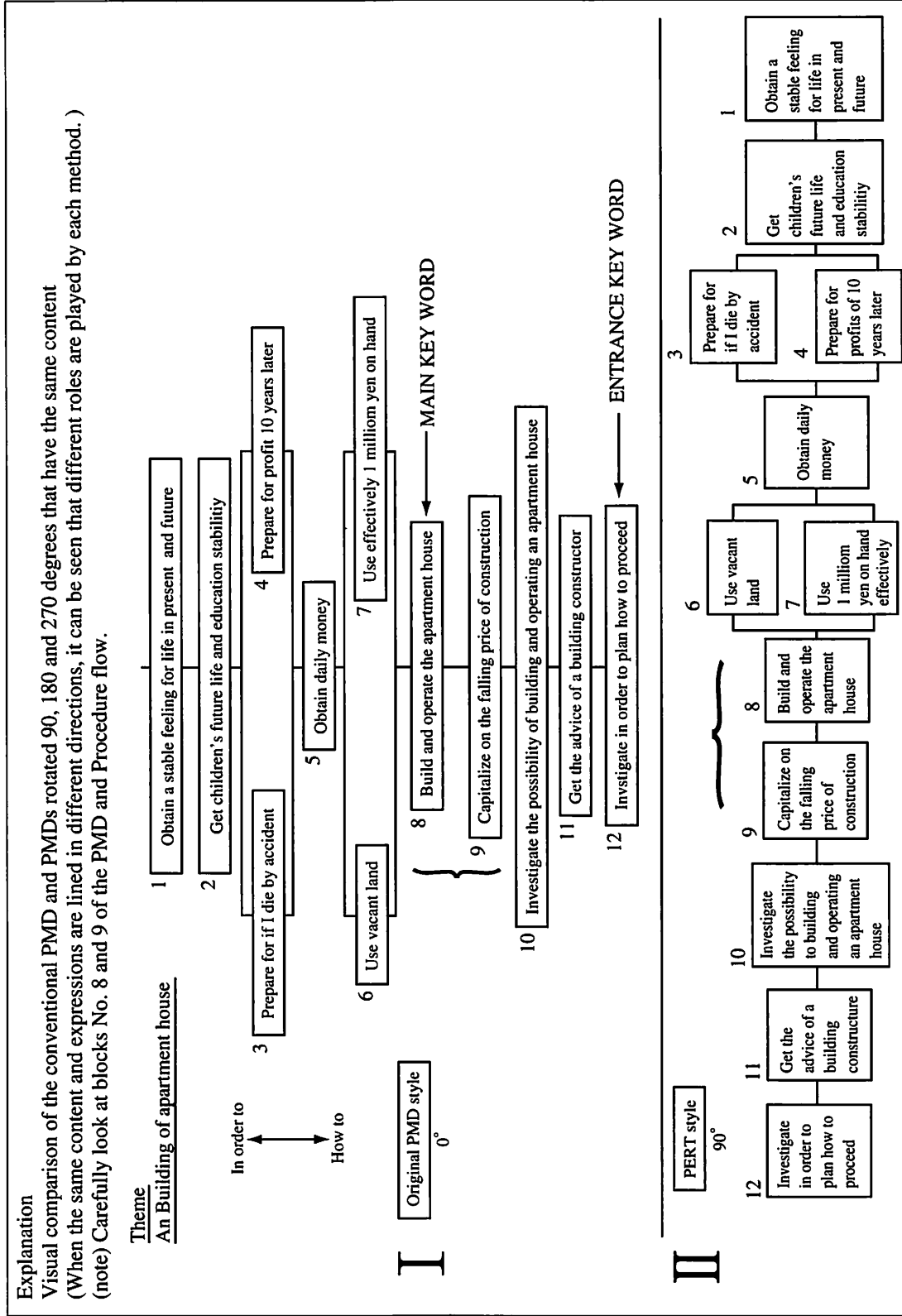


procedure based on the direction of intention, how to take out a loan and the bank's posture will change accordingly.

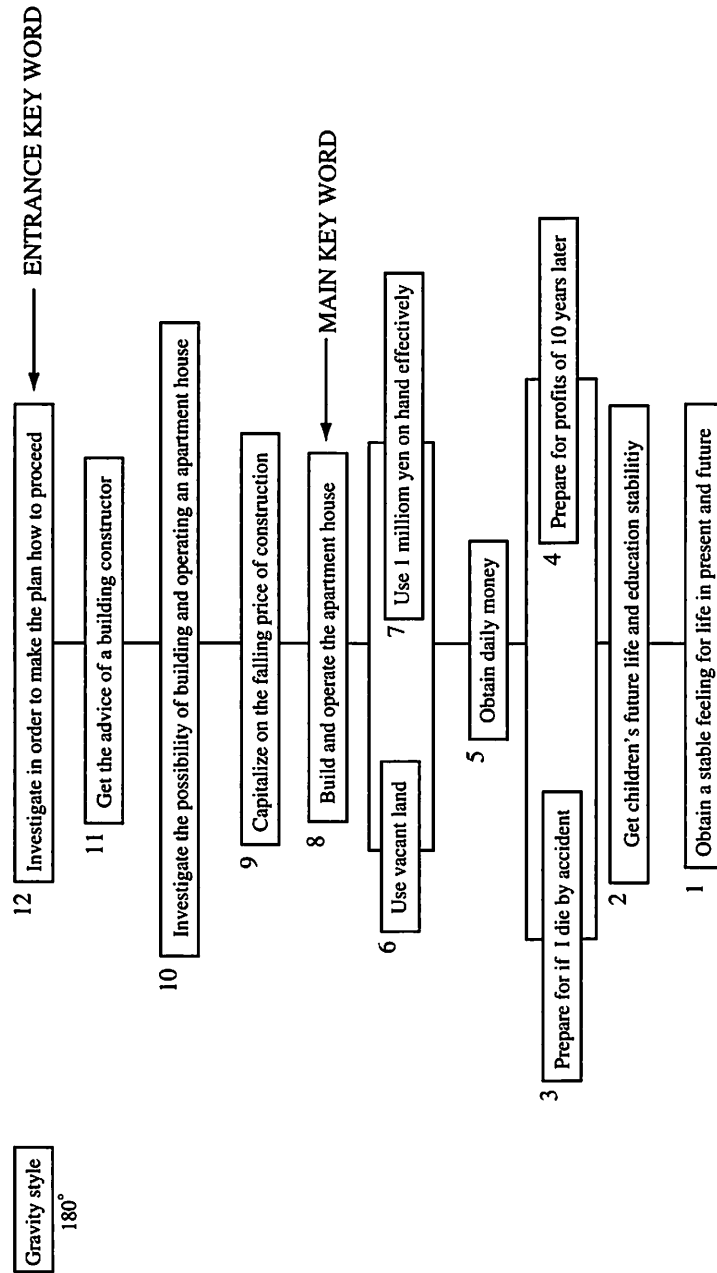
(3) In addition, if we look at procedural sequence the expressions II "6. use vacant land" and "7. use of \$100,000 on hand" needs to come to the very bottom as is the case with the vertical PMD I , and, it may seem that "12. Investigate how to make a Plan Document" will not start. However, it was so arranged in PMD I since the owner of the future building was afraid that if inflation occurred, it would prevent the building from being erected. Therefore, the expressions come from the Purpose-Measure relationship and is different from the procedural position. That is why a rough procedure can be seen in the diagram when reading from the bottom to top. (as stated in Chapter 3-3-PMD-(11) on page 47 .

(4) The III expression, the gravity and procedure flows are where the procedure has been thought out and the results anticipated. If It can be seen that the FAST (Function Analysis System Diagram) expression found in IV is written horizontally and is a common way of expressing in culture, it is difficult to grasp which expression is the key fundamental function expression (at the needs level).

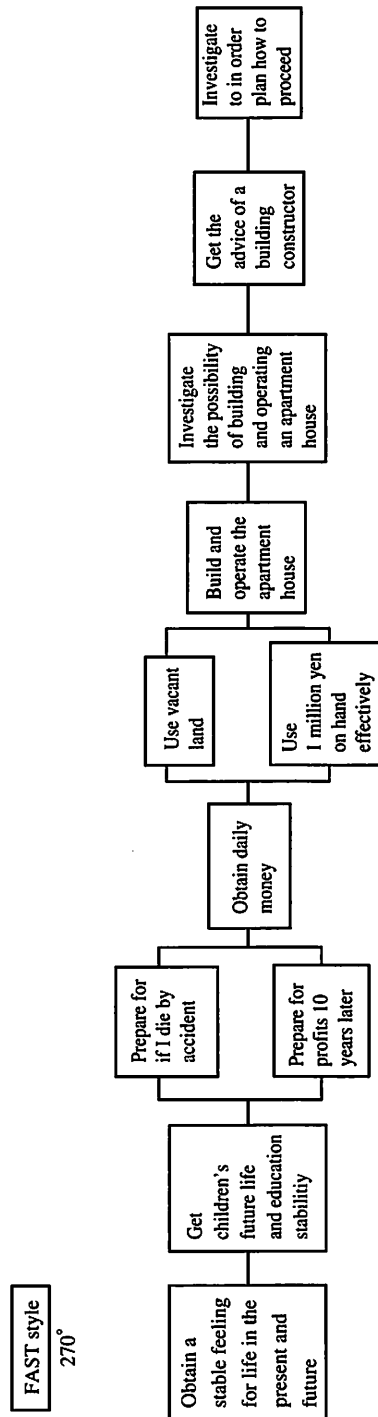
Diagram of column 5 explaining "Comparison diagram showing the differences in nuance when the PMD is rotated in increments of 90 degrees".



### III



### IV



Comparison of the conventional PMD and PMDs rotated 90, 180 and 270 degrees that have the same content.(When the same content and expressions are lined in different directions, it can be seen that different roles are played by each method.)

(Note) Carefully look at blocks No. 8 and 9 of the PMD and Procedure flow.

- The PMD is effective for making the best use of opportunities that only come along once or twice in a lifetime.
- The Procedural flow II is effective in expressing the different Cause-Effect relationships other than Purpose-Measure relationship I .
- The PMD I allows one to grasp the Direction of Value (same as Direction of Intention) and the Main Entrance Key Word.
- It should be noted that in this format, the sequencing of blocks 8 and 9 of the vertical PMD appear to be written in reverse.
- Thus, it can be said that the vertical PMD I is effective in managing the important points in matters that concern with opportunities or problems burdening one's mind.
- The Steplist uses this Cause-Effect principle.
- The Mindset of English sentence patterns such as I make you happy.

**Column 6: "Design To Customers' Needs" the founding principles for the "Method for Creating Wisdom from Knowledge", to reach common goals in business and management seamlessly**

The expression "Design To Customers' Needs" (DTCN) was coined together with "Design To Cost" policy thinking developed in the United States during the 1970s. The phrase "Design to Customer Needs" is an imperative and indicates a policy.

The policy has the following meaning and effect.

- (1) When making decisions for the customer, one must determine who the customer is; this becomes the basis of all thinking and action. As a result, systematic decision-making and action will occur.
- (2) Also, every decision made must be made for the customer, so there is no room for poor decision-making (ill-natured and unhealthy decision-making or black-hearted decision-making)
- (3) The purpose of DTCN is creating customers and satisfying those customers' needs.(The customer may include oneself)
- (4) On the other hand, the supreme goal of an enterprise, which can be set without running into an impasse, and the goal of a profit-making enterprise are related as follows:
  - ① According to P. F. Drucker and others [1], the supreme goal of an enterprise without impasse is to create customers and satisfy those customers' needs."
  - ② To realize this uppermost goal, the enterprise must maintain service, and develop the next product or system to satisfy customers and the next customers' needs.
  - ③ In order to maintain service, and develop the next product or system to satisfy the next customers' needs, the enterprise must survive. To survive, the enterprise must get a minimum amount of profit. This is the goal of enterprise profit-making.
  - ④ For the government, read taxes instead of profit.
- (5) Therefore, when making a PMD the following purposes
  - ① Defend the earth.

② Create a customer.

③ Satisfy the customer.

should be at the same upper most level in order not to run into any dead ends.

(6) Also, another important point is that once it becomes clear that the present target can be realized, one should ask the question "What will become of it?" Although everything may look as if it is proceeding well now, it is necessary to make plans in advance so that particulars would be set in place preventing the earth from being ruined in the future, or with the 3-5 improvement method a structure would be made for switching to a new mechanism in the next level.

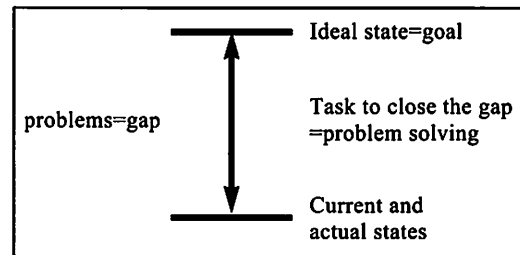
[1] P. F. Drucker : Management, Tasks, Responsibilities Practices. Hyper & Row, 1974

As the limiting conditions for the objectives of profit, Drucker's policy on management is expressed by, "A company's primary responsibility is to serve its customers. Profit is not the primary goal, but rather an essential condition for the company's continued existence." (Also refer to "The Practice of Management" *Harper & Brothers, 1954*)

## Column 7: Comparison with the conventional problem solving method

The method described up to now was for task realization.

In Chapter 1, it was stated that the realization of the "Task" solves the "Problem". Conventionally, solutions to problems were recognized and defined as below where they are attained by following the next work phase.



1. Gathering information: Information is gathered from the environment and analyzed, and a problem for which a solution is needed is discovered.

2. Search for comparative plans (alternatives):

Search, and make alternatives for solving the problem discovered in the previous phase. When doing so, as humans have limitations in their information-gathering capacity, not all the alternatives can be found.

3. Evaluation of comparative plans (alternatives):

The results of searching for alternatives are predicted, compared and evaluated. When doing so, as humans have limitations in their calculation ability, a perfect prediction and evaluation are impossible.

4. Selection of comparative plans (alternatives):

The results of each alternative are predicted, compared and evaluated, and the alternative that satisfies the standard of the evaluation is selected. However, as humans have limitations in their rationality, one cannot help but to conduct decision-making based on the principle of attaining satisfaction.

5. Implementation of comparative plans (alternatives):

The selected alternatives are implemented and the prescribed results are secured.

6. Feedback: The results of the implementation are evaluated and analyzed and the information is fed back to the next decision-making.

This is how problem solving was conventionally carried out. And, according to the contents of phase 2, discussions which had problems in creativity (necessary conditions) were conducted.

In addition, various styles of problem solving methods and problems in creativity were discussed. However, in Chapter 1 of this book the problem was assumed to have the one condition, to realize the task. With this in mind, the mindset and methods conveyed from Chapter 2 basically do not contradict the above conventional method for problem solving, but is thought to greatly embrace it.

Moreover, by grasping the PMD and Keyword, what have been described as "hypothesis establishing (abduction)" and "deduction (keyword)" approaches can be conducted all at once. Deduction, which follows the hypothesis establishing, is the Keyword expression. Induction is used for phases 1 to 4 of the Steplist to verify and evaluate. The "deductive approach" (phases 5 to 8 of the Steplist) is used to deploy the evaluated results for creating an embodied mechanism useful for society.

Besides this, the natural phenomena that has occurred up to now, the problem of clarifying the cause-effect relationship of things that occurred in the past and to predict future natural phenomena and solve the problems of its influence, because the results are known, an RCD (Result Cause Diagram) is created to know what needs to take place in order for those results happen when establishing a hypothesis, which is similar to the PMD. For future natural phenomena, an FRCD (Future Result Cause Diagram) is created and its Keyword is grasped to be a deductive expression where its contents are verified and evaluated inductively. Through the problem solving and task realization methods discussed in this book and not in the conventional sense, the results are then made useful to society. Though still in its rough form, this has been presented in the Japan Creative Society thesis (1999) "A Procedure and Format for the Thinking and Action of "Abduction, Verification, Evaluation and Decision Making" to Reveal Rational Past Mechanisms and to Create Future Mechanisms" (The contents can be downloaded from the following URL.)



Japanese version

<http://dtn-wisdom.jp/J-Edition%202/J20%20app%20H%20abduction%20J.pdf>

English version

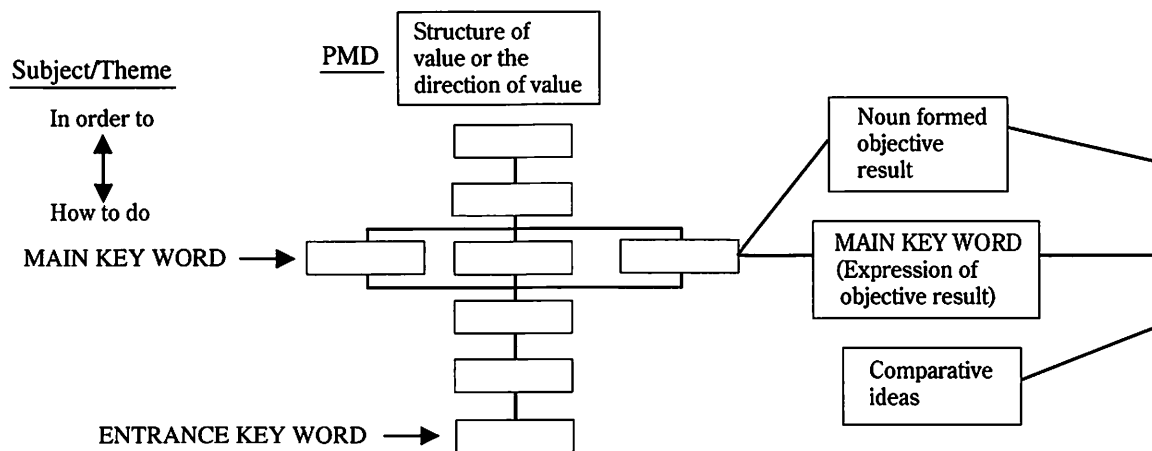
<http://dtn-wisdom.jp/E-edition%201/18-Appendix%20H%20R6%20Acrob4.pdf>

## Column 8: The relationship between PMD, Steplist, FBS, and 3-5 Phase Improvement

Using Fig. 1, let us explain the relationship.

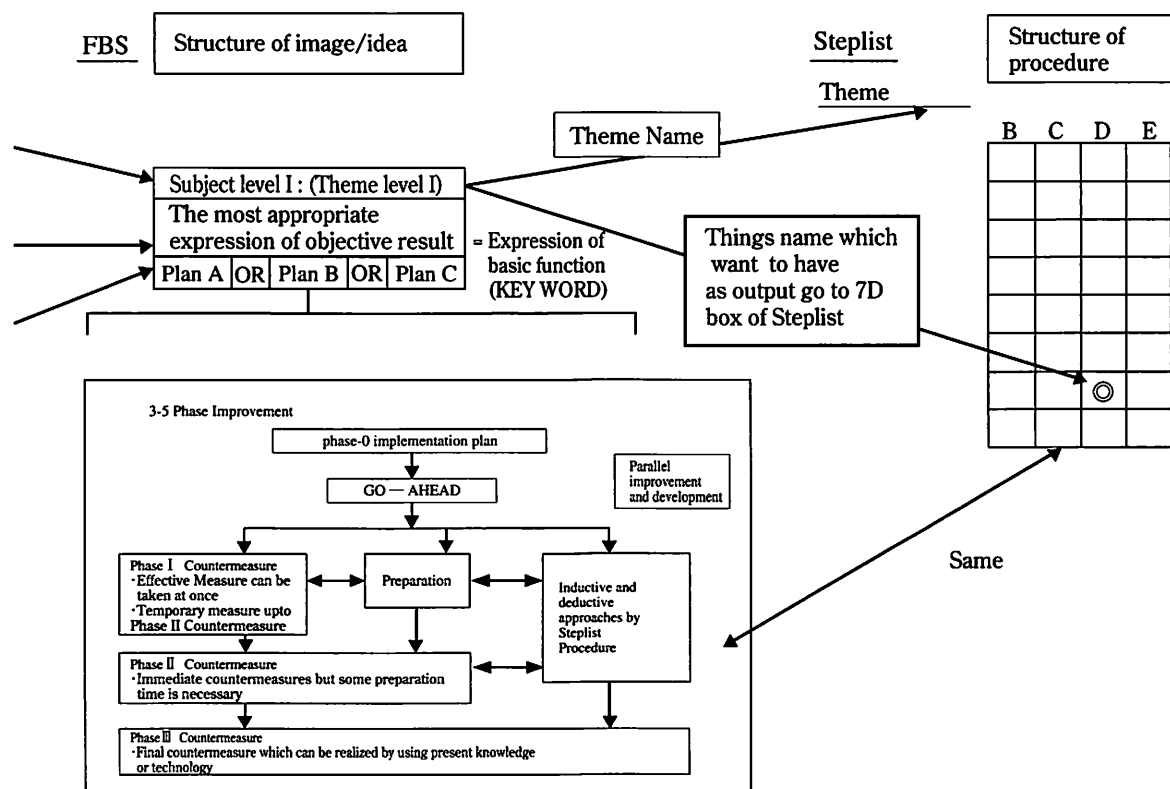
1. The Key Word of PMD is the functional expression of the desired result (in brief "do something").
2. This functional expression becomes the upper most theme name (subject level I name) of the FBS. In the previous FBS example, it was "a desk for easy study and work." If we move from the basic functional expression (Key Word) to the name of the subject of a higher level theme, we may wonder whether it is enough for the function of "a desk for easy study and work" to be restricted only to the Key Word. We are then led to an exact expression of the function and images of a desk for easy study and work. Fixed as nouns or noun phrases, they constitute the "exemplary theme

**Fig1.The relationship between PMD, Steplist, FBS, and 3-5 Phase Improvement**



expressions" of the FBS.

3. When constructing the Steplist, the first thing to do is to put the "exemplary theme expressions" of the FBS, which is the noun expression of the desired result into column 7D. We can then create procedures to realize the desired result by filling in elements from the upper flow into these columns. This is how a procedure is created by the Steplist (from the PMD).
4. The relationship between a PMD, a Steplist, and FBS is as above, but when considering whether it is enough for the function of "a desk for easy study and work" to be restricted to the Key Word only, additional images may arise. In this case, we apply the 3-5 Phase Improvement Method. That is, we classify the images as "immediately realizable and effective," "pressing but preparation is necessary," or "to consider for future realization phase-wise," add them to the appropriate columns and take steps to materialize them.



## Afterword

This book is an accumulation of many years of on-site experience to realize the task. Within it is the acquired "Method of creating innovative things and systems" and what begot it was the "Method for Creating Wisdom from Knowledge" which is explained so that the layperson could understand it.

Although the main emphasis of this book was for the realization of tasks, planning and management, which centers around the PMD methodology, is a management methodology which creates the future. It describes the method for creating wisdom. On the other hand, intelligence as understood by the author is the ability of effectively gathering and using data, information, knowledge and wisdom. The 3 uppermost purpose of this book is to defend and save the earth, create customers and satisfy customers. Thus, with these purposes in mind for all PMDs, a reasonable Purpose Measure Diagram can be created without ill intentions.

However, the field of researching how results seen in the actual world are occurring or had come about uses a scientific method to examine the cause-effect relationship in order to grasp the knowledge which becomes a resource for creating wisdom. In this book, in regard to "Management methodology for creating the future", I would like to separate this by calling it, "The method for scientifically examining the cause-effect relationship of phenomena that is occurring now or had occurred in the past". As to this latter method, because the results or the current state of things can be seen now, in place of the PMD (Purpose Measure Diagram) the RCD (Result Cause Diagram), which has a similar pattern, can be created to facilitate scientific research.

In regard to this method, although the author has already presented a practical thesis, it was not touched upon in this book since the volume would have been too large. However, although a translator was not used in the English writings, the details can be found in the URL below. The author hopes that the readers would use it as a reference.

<http://dten-wisdom.jp/E-edition%201/18-Appendix%20H%20R6%20Acrob4.pdf>

Moreover, I have already established a more definite and detailed task realization approach and so I would like to publish them one by one hereafter. The main contents are the following although both are not tasks.

1. How to decide the reasonable purchase price

2. A method of management that unites actions having will and accounting.  
(a method where engineers will easily understand accounting, office clerks and engineers will synchronize their collaborative activities and jointly conduct precise activities and decision making).
3. Method of new project management and system engineering (including Design to Cost/Target-Value Design method).

As a matter of fact, these manuscripts (pre-drafts) are almost complete, and a portion of them have already been made public on the Internet. After reading this book, I hope that it be used by readers around the world as long as they contact me with their intentions and contact information. By using the principles of this book, creating wisdom from knowledge, the details and status quo of what was made possible and what was achieved are indicated in the following URL.

<http://dtn-wisdom.jp/E-nannni%20tukaeruka.html>

Furthermore, the methodology for deciding the Reasonable Purchase Price (part of the original proposal).

<http://dtn-wisdom.jp/E-edition%201/06-01-Chap%205%20R2-Steplist-Reas.pdf>

A method of management that unites actions having will and accounting, present situations, Administrative accounting that creates wisdom: the entire explanation

<http://dtn-wisdom.jp/E-explanations/management%20acc%20for%20Wisdom%20r4.pdf>

Method for Changing Knowledge to Wisdom (= "Method for Creating Wisdom from Knowledge") (the entire summary explanation and its applications)<http://dtn-wisdom.jp/E-edition%201/Paris01r4.pdf>

pd

DTCN/DTC Methodology (method of combining project management and system engineering)

Conventionally, the additions and revisions of Advanced Project Management Methodology (= DTCN/DTC methodology) which have been in the public domain.

<http://dtn-wisdom.jp/E-pdf%20entrance.html>

If you want to provide printed book, ask it at \$300.00 expect mailing cost, Mr. Shin Taguchi

shin.taguchi@asiusa.com in north and south America, or ask it at €300.00 it except tax and mailing cost , Mr. Takehiko Abe abe.takehiko@neuf.fr in Europe and Africa, or ask it ¥30,000, Mr. Takashi .Miyaszawa miyazawa@jmma.gr.jp in Asia. See page 202-203 for more details.

Translator and Original writer want to contribute to defend the earth and create customers' needs with you.

After having this book, we can exchange the broad ideas through concept and methodology of more detail book “Advanced Project Management Methodology with Method for Changing Knowledge to Wisdom in Wisdom Management Era” <http://dtn-wisdom.jp/> and Blog site of <http://dtn-wisdom.net/E> .

Additional comments to this book, Order form and Synopsis of other related publications will appear at <http://dtn-wisdom.jp/00001-R3e.pdf>

2008-9-17 Michihiko Esaki

## Afterword of the translator

After reading this book, one may have a sense of familiarity to the processes explained, and at the same time a sense of alienation.

The reason for this is because as Dr. Esaki has explained in the beginning of his book, most individuals especially working professionals have unconsciously used the PMD technique.

However, it has never been clearly or fully explained. Also, once readers gain hands-on experience with Dr. Esaki's technique, one can quickly realize that the opinions and proposals of individuals of a group or organization, regardless of gender, nationality, social or economic status, educational background, religious or political standing, etc., will be taken into consideration.

This is quite important in society and in organizations where one can easily view just where their proposals were incorporated in the overall plan, creating a sense of belonging by taking into consideration all views from individuals.

In rational decision-making, the most preferred set of consequences from a list of comparative plans (alternatives) are selected. However, individuals or organization cannot possibly be able to know all the comparative plans let alone all the consequences. The "black-box" of successful individuals or organizations can be mimicked by any individual using the PMD.

Yet, this book is not just about the PMD but how wisdom is created from knowledge. What is hopeful is that knowledge is not limited to the individual's experience or education, but can be attained from various sources and is abundant.

If one can make choices that are most efficient or practical (in other words, "correct" according to what is presently known or is accepted as universally true), then it can be said that that individual is exhibiting intelligent behavior (according to the beliefs and views of that individual's culture or region).

Dr. Esaki's methodology offers such decision-making to the reader. I cannot help but to make reference to William Ross Ashby and Herbert Simon who were both involved with artificial intelligence. In their endeavors, making the "best" selection or choice seemed to be the key condition for decision-making or problem solving.

Does Dr. Esaki's methodology offer in a clear concise way of choosing the "best" alternative,

which also incorporates the individual's or organization's will and create wisdom at the same time? I believe it does.

Dr. Esaki has pointed out that from the view of "saving the earth and creating and satisfying customers", a plan of action without ill intentions can be created.

And with the ability of analyzing past, present and future outcomes, it has the ability of bringing to light all hidden agendas of individuals inconsistent with the policies of society or organizations.

Once this methodology becomes a part of one's decision-making process, one cannot help but to feel a sense of being more logical, efficient and intelligent than what one used to be or thought possible.

Chris Chikara Nishihama Aug. 30, 2009



## **Appendix 1 (this appendix is for professionals only)**

This appendix clearly explains the relationship of the Project Management and System Engineering methods using the Method for Changing Knowledge to Wisdom (DTCN/DTC Methodology) . (= "Method for Creating Wisdom from Knowledge")

(Note)

In brief, if I were to use an expression that would make the SE and PM relationship easily understood, I would state "According to the PMD, which indicates the same direction of intention, the SE method takes charge of the "mechanism, device and usage of things and systems", and the PM deals with the procedure and organization of the same "mechanism, device and usage of things and systems" in order to realize them."

DTCN/DTC Methodology (Method for changing Knowledge to Wisdom) is the method which integrates Project management (PM) and System Engineering Management (SE or SEM) methodology.

Briefly explaining the relationship between PM and SE, SE is the structuring method to create optimized things and/or system structure whereas PM is the procedural method to create the stepwise procedure to create the optimized the things and/or system structure result and its operating procedure.

The common part among SE and PM is the direction of will or value of owner for obtaining the objective result. This common part is inside the square ——line in App-fig. 1 page.

Explaining to accordance with ○ number in App-fig. 1, the explanations are as follow.  
-----line is the domain of SE for creating the optimized thing's and/or system structure and how to use it as the objective result.  
-.-.-.- line is the domain of PM for input and output stepwise procedure to realize the objective result.  
Upper left side —— line is the common direction of will or value of owner.  
Lower right side —— line is the Work Unit ( = work package) common to do anything in combination of SE and PM.

DTCN/DTC methodology is method to create and maintain and expedite these contents in an optimizing manner.

- ① is PMD (Purpose Measure Diagram) WBS which shows the direction of will or Value of owner to reach the objective result among the stake holders concerned.
- ② is Steplist which divides faultless Phased steps WBS which show the process and procedures which are consisted of inductive approach process and deductive approach process to reach the objective result with faultless four frame Work unit in each step.
- ③ RO (Root Organizing) structured organization WBS in which we can proceed inductive approach team process and deductive team approach process to reach the objective result.
- ④ is the hierarchy layered Implementation plan documents which include Steplist between Prime and Sub-contractor. The concrete details example are shown in  
<http://dtn-wisdom.jp/E-edition%201/04-03-Chap%203%20R7-LayeredStepl.pdf>

- ⑤ is the optimized parent and children thing and /or system structure WBS which is to be created by using FBS technique.
- ⑥ is the basic faultless four frames model to check faultless operation or procedure of input and output process or procedure ( equal to Function Flow Block Diagram method in SE ).
- ⑦ are the Subjects to be assured (e.g. Mission success, Function-Performance, Safety-Reliability, Development cost, Unit production cost, Logistic support cost, Man hour cost at site, and cost etc.) by using the process of faultless four frames mechanism of Phased Steplist method. Also, these results are optimized by using PMD and DTCN/DTC trade study work method.
- ⑧ Final top-down WBS relationship of operation result of things and/or systems.
- ⑨ is the basic faultless four frames input and output related work unit (= Work Package unit ) to proceed with PM and SE.

This integrated and systematic method was invented by Michihiko Esaki Ph.D. Japan, in 1986. The detail explanation of this mechanism appears in the Book of “Advanced project management methodology with method for changing Knowledge to Wisdom: DTCN/DTC (Design to customers’ Needs / Design cost Method”.

And this book whole contents can be down loaded from  
<http://dtn-wisdom.jp/E-pdf%20entrance.html>

Anyone can download the full methodology from this web site and can use methodology in condition of quoting from what chapter or URL are used.

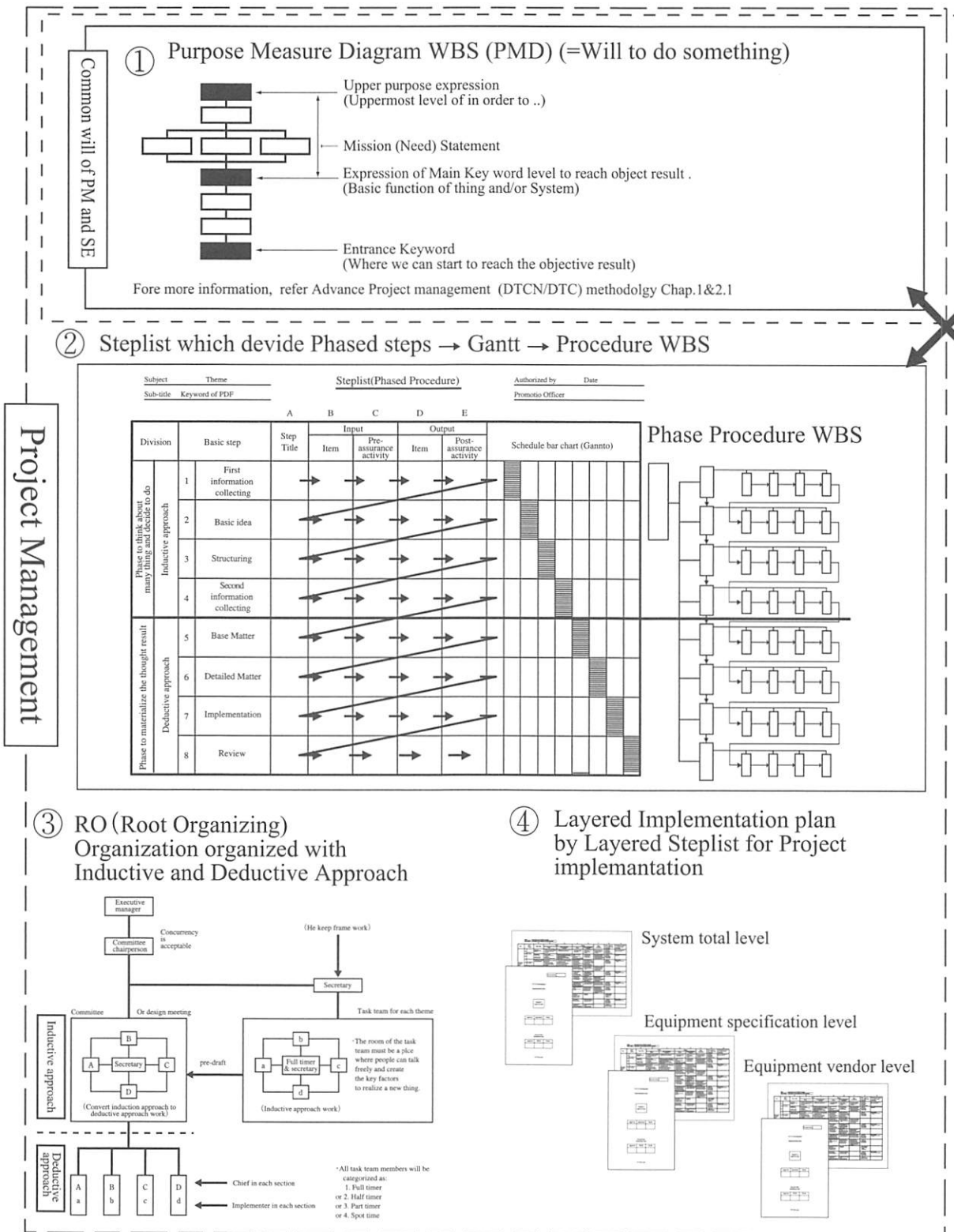
The originator and translator are very happy if methodology user send the printed document of usre’s article using this methodology to combine PM and SE method (Pdf file is acceptable) to Dr. Esaki’s e-mail address:

Michihiko Esaki Ph.D. e-mail address is [esaki@dtn-wisdom.jp](mailto:esaki@dtn-wisdom.jp)

Address 1-3 Nagara-miyaji-machi, Gifu City Japan, 502-0053

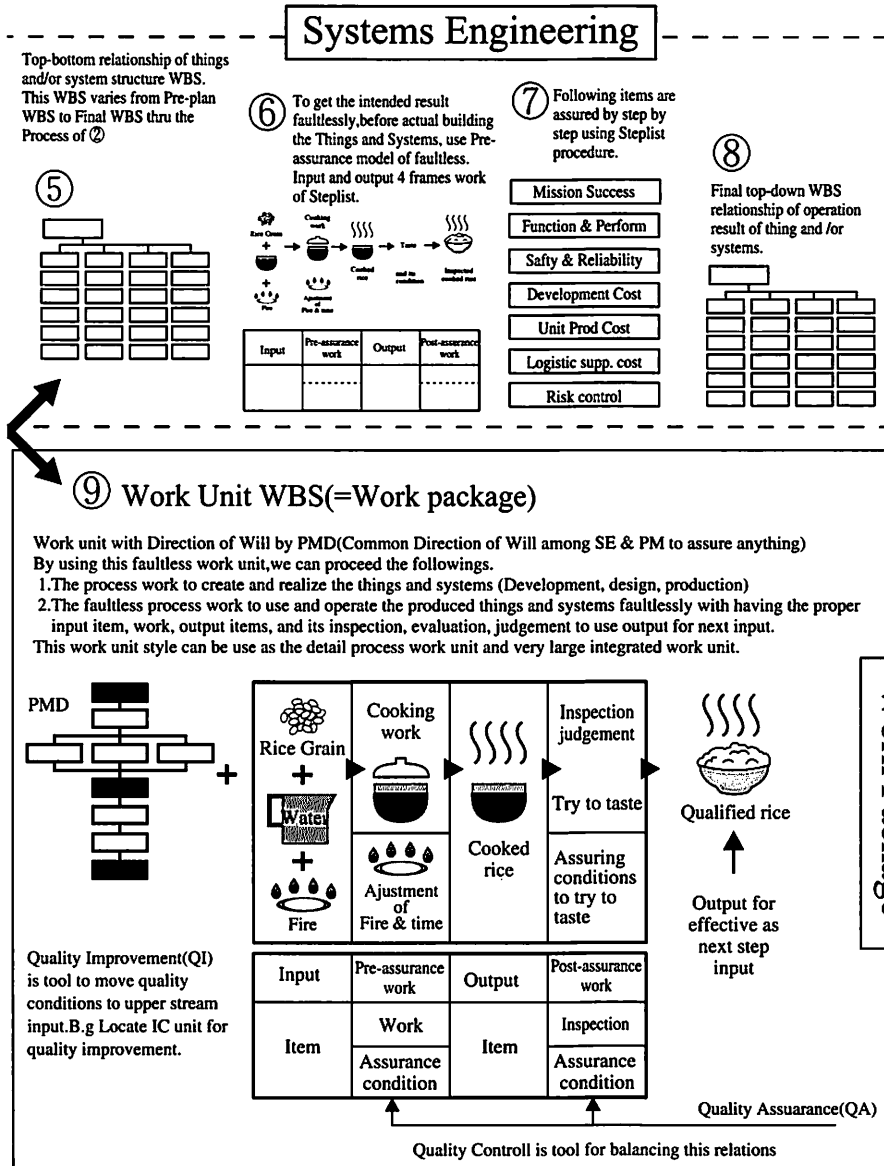
Chris C. Nishihama e-mail address [jccompassion@yahoo.co.jp](mailto:jccompassion@yahoo.co.jp)

# APP-fig1:Relationship between Project Management, Systems Engineering



## and Work package WBS

Michihiko Esaki 2008-4-15



The relationship of definition of Mission (need) Statement(MNS), Scope and SOW(statement of work) are as follows.

MSN is the upper portion of purpose measure relationship of ① main key word i.e. Common Will of PM & SE.

Scope is the extent of work ⑤ and ⑦ to realize the mission need statement according to MSN.

Statement of Work is "to do work" in order to realize the Common will of PM & SE..

Therefore, "Statement of Work" have to state the do work contents of ②,③,④ briefly by statement.

It is recommended to express the Statement of work briefly to use the Steplist④format and contents with ④, because to clearly state the input and output work and decision point for full scale development go-ahead to change inductive to deductive approach.

Explanation of relationship between Systems Engineering, Project management, many kind of WBS and work package WBS

- ① is Purpose measure WBS (Say PMD-WBS) to realize the common will of SE and PM
- ② is Faultless Phased Procedure WBS (Say Steplist WBS) to realize the will of SE and PM
- ③ is Organization organized with phased Inductive and Deductive Approach (Say-Root Organization WBS) to realize ②
- ④ is layered prime and sub-contractor phased procedural WBS implementation plan to proceed ②
- ⑤ is " Things and /Systems structure WBS" to realize the will of ①(top-down structure)
- Pre-planned WBS ⑤ varies to final WBS ⑧, same as content of 7D column of Steplist ②
- ⑥ is Pre-assuring operation and procedure WBS model, to build final WBS ⑧
- ⑦ is The assuring items structure WBS of development and operation of ⑧, as final result.
- ⑧ is Final Things and /Systems structure WBS to realize the will of ①
- ⑨ is Work Unit WBS (=Work Package WBS) effectively to realize the operation result from ⑤ to ⑧ through examining ⑥, ⑦ according process

## **Appendix 2 (this appendix is for professionals only)**

This appendix shows a sample of the basic contract model of the Japan Materials Management Association (Basic contract between buyer and buyee). When translating this contract, the expression and format will vary from country to country depending on the background and culture, and so only a direct translation and the original Japanese document will be included. Therefore, according to the circumstances of each country, the actual usable contract will need to be translated in the respective countries. The important point of this contract is found in Article 5. Because of this clause, Japanese businesses become hierarchized and it lays the foundation for vector aligning the industrial group. A concrete example of this can be seen in an investigation conducted by Dr. T. Nishiguchi (Hitotsubashi University, Tokyo) in the latter half of 1980, where it was found that the scope of the purchasing activities of GM with 6,000 buyers were accomplished by Toyota with only 300 buyers.

### **(Note)**

The author nor translator vouches for the accuracy of the translation of this General Agreement of Trade which has been made by a third-party translator. The expressions or wordings of this agreement will differ according to the customs, cultures and laws of the countries for which it is desired to be used and so a professional translator who is knowledgeable in this field is required to translate this document even before one considers utilizing it. In the case where an agreement document is created in your respective countries based on this model, the author and translator would be very interested in receiving a copy of it for the sole purpose of understanding the different laws governing different countries.

The Japan Materials Management Association added the item "This contract shall also apply to the sub-buyees." to their documents.

## **Basic agreement for trade**

In regard to the agreement between ○○ Corporation (Hereafter called, "Buyer") and △△ Corporation (Hereafter called, "Buyee") the execution of the necessary basic items in the contract for the trading of materials, equipment, buying and selling of parts, as well as their manufacturing consignment (including repair consignments, which shall be considered to be the same hereafter), shall be conducted in the following manner.

### **Paragraph 1 General agreement of trade**

#### **Section 1 basic agreement and individual agreements**

- 1) All individual transactions (hereafter called, "individual agreements") conducted by the buyer and buyee shall follow the matters stipulated in this basic agreement unless a special agreement exists that states otherwise.
- 2) The buyer and buyee shall follow the particulars of this agreement and the particulars in the purchase order provided by the buyer as well as the specifications, drawings, installation specifications, etc., required in preparation for the transaction established by the buyer.
- 3) The buyer and buyee may exclude the partial application of a clause and establish particulars different from this agreement in individual agreements.

#### **Section 2 Approval of the individual agreements**

- 1) As to the application of the individual agreement according to the purchase order and drawing, specifications, installation standards, etc., that was stipulated by the buyer in detail in the order contents,
  - (a) the buyee will present the purchase order to the buyer or
  - (b) within 5 days after application, if there is no notification of acceptance or rejection from the buyee, the application will stand.

- 2) After the lapse of the period stated in the preceding clause A), the buyee will not be able to deny its acceptance.

### **Section3 Change of individual agreement**

- 1) .....
- 2) .....
- 3) .....

## **Paragraph 2 Registration**

### **Section 4 Obligation to register**

- 1) .....
- 2) .....
- 3) .....
- 4) .....

## **Paragraph 3 Cost Estimation**

### **Section 5 Presentation of Cost Estimate**

- 1) The buyee shall submit the cost estimate upon the request of the buyer.  
Moreover, the when the buyer requires it, the buyee will promptly submit the cost estimate breakdown according to the designated format/breakdown details.
- 2) The buyee shall not bid-rig nor do other illegal conducts ( Including cartelling the costs).

## **Paragraph 4 Supply**

### **Section 6 Supplies such as materials**

- 1) .....



- 2) .....
- 3) .....
- 4) .....

#### **Section 7 Proprietary rights of supply goods**

- 1) .....
- 2) .....

#### **Section 8 Jig, tools and etc.**

.....

#### **Section 9 Handling of supplies and goods on loan**

- 1) .....
- 2) .....
- 3) .....
- 4) .....
- 5) .....
- 6) .....

#### **Section 10 Reduction of damages to supplies and goods on loan**

.....

### **Paragraph 5 Delivery**

#### **Section 11 Delivery date**

.....

#### **Section 12 Change of Delivery date**

- 1) .....
- 2) .....
- 3) .....

### **Section 13 Acceptance**

.....

### **Section 14 Partial delivery**

.....

### **Section 15 Attachment of documents for delivery**

.....

## **Paragraph 6 Inspection**

### **Section 16 Inspection of acceptance**

- 1) The buyer, according to the foregoing paragraph, is to promptly conduct inspection and deliver a document proving the pass or fail of the specified goods to the buyee.
- 2) As an inspection of the preceding clause, the particulars of the criteria, etc., of the sampling, extraction and pass or fail is to be conducted at a place designated by the buyer.
- 3) The buyee reserves the right to request a screening inspection regardless of the preceding clause.  
However, the increased cost of conducting a screening inspection shall be born by the buyee.
- 4) Damages caused to the specified goods by the inspection process shall be born by the buyee, except in cases where it is clearly the buyer's fault

### **Section 17 Actions for discrepancy**

- 1) .....
- 2) .....

### **Section 18 Special Acceptance**

- 1) .....
- 2) .....

### **Section 19 Rejected goods and its return deliveries**

- 1) .....
- 2) .....
- 3) .....

### **Section 20 On-the-spot inspection**

If necessary, the buyer reserves the right to conduct inspection on the specified goods as stated in Section 16 as well as on the materials, parts, tools, apparatus, equipment, etc., used in the item in question and on the incomplete states of production, processing and repair at buyee's site.

### **Section 21 Transfer of ownership**

The ownership rights of the specified goods shall be transferred from the buyee to the buyer when the inspection in Section 16 is passed or is received by the Special Acceptance of Section 18.

## **Paragraph 7 Payment**

### **Section 22 Accounts Payable posting**

- 1) When the ownership rights is transferred to the buyer as stated in Section 21, the cost of the specified item will be summed up to the accounts payable of the buyer for that month.  
The price of the correspondence and target a thing is summed up to the accounts payable amount of the buyer this month.
- 2) In regard to the previous accounts payable posting, a certain day of every month is to be established by the buyer as a deadline.

### **Section 23 Payment**

Payment of the accounts payable is to be made to the designated place and conducted every month on the day established by the buyer

## **Section 24 Price acceptance**

.....

## **Section 25 Compensation**

- 1) .....
- 2) .....

## **Paragraph 8 Drawings, specifications, etc.**

### **Section Maintenance and control of Drawings, specifications, etc.**

- 1) In regard to the drawings, specifications, regulations, standards, etc., that are on loan from the buyer to the buyee (hereafter called 'loaned documents'), are to be handled by the buyee in a sincere manner and with care, bearing their responsibilities to the buyer. When the period of loan is finished or when the buyer asks for their return, the buyee is to return them immediately.
- 2) The buyee is not to use the loaned documents other than the purpose outlined in the agreement.
- 3) The buyee is not to make any copies of the loaned documents unless permission was given by the buyer beforehand.
- 4) The buyee is not to allow the inspection of the loaned documents, nor their loaning or rendering to third parties unless permission was given by the buyer.
- 5) If the buyee destroys or damages the loaned documents, the buyee shall compensate the buyer for their loss.

## **Paragraph 9 Assurance**

### **Section 27 Quality control**

When the buyee is instructed by the buyer, the buyee will establish a quality control organization according to the specifications common to the quality control established separately by the buyer for the quality maintenance of the specified item related to the

manufacturing consignment.

## **Section 28 Guarantee**

- 1) .....
- 2) .....

## **Paragraph 10 General Particulars**

### **Section 29 Bearing of Risks**

.....Section 21.....

- (a) .....
- (b) .....

### **Section Banning of Production and Sales**

The buyee, except in the case where a document of acceptance from the buyer is received, must not produce or sell goods according to the drawings or specifications of the buyer nor similar goods with partial changes made to the specifications to third parties.

### **Section 31 Banning of face-to-face negotiations**

The buyee, unless instructed by the buyer, must not have face-to-face negotiations related to the specified items with the buyer's clientele.

### **Section 32 Non-Disclosure Agreement (NDA)**

The buyer and buyee according to this agreement or the individual agreements must remain silent as to the business secrets learned of the other party until the expiration of this agreement, and strictly maintain the secrets even after the term of the agreement.

### **Section 33 Industrial property**

- 1) When the buyee is going to apply for the industrial properties such as patents, rights of utility models, designs, trademarks, etc., of the buyer's drawings and specifications of the specified items, prior written approval must be attained from the buyer.

- 2) In regard to the things belonging to the industrial property in the preceding clause, the buyer and buyee shall confer and establish them.
- 3) Due to the actions of the buyee, if disputes of infringement of rights of industrial property, etc., arises between third parties in regard to the specified items, the buyee shall bear full responsibility in its settlement and not involve the buyer.

#### **Section 34 Third-party damages**

.....

#### **Section 35 Fulfillment of obligations**

Even if the buyee, with the agreement of the buyer, consigned the production, processing and repair of the specified items to third parties, the buyee shall not escape the obligations of this agreement nor the individual agreements.

#### **Section 36 Transfer of rights, obligations**

Both the buyer and buyee except with a written approval of the of the other party shall not transfer or supply as collateral either in whole or in part the rights and obligations (including claims and liabilities) generated by this agreement or the individual agreements to third parties.

#### **Article 37 Delay compensation**

.....

#### **Article 38 Guidance**

The buyer when necessary may dictate or give guidance to the buyee the management of the manufacturing technology, quality and delivery date as well as equipment improvements, safety controls, etc., of the specified items related to the manufacturing consignment.

#### **Section 39 Cancellation of the agreement**

Both the buyer and buyee may cancel this agreement at any time 3 months after their notification.

#### **Section 40 Validity of individual agreements**

Even in the case where this basic agreement has been cancelled or has become void due to the term coming to an end, it shall still be valid for the life of the individual agreements that are still in existence.

#### **Section 41 Release of the buyer**

- 1) The buyer shall reserve the right to cancel this agreement and the individual agreements with the buyee either in whole or in part without any notifications or the need for other procedures if the reason falls under one or more of the following purviews.

In this case when necessary, the effective cancellation may be made in the future

- A. When the buyee violates one or more of the arrangements of this basic agreement or the individual agreements.
- B. When the buyer acknowledges there is no good reason for delay and that it is hopeless for the buyee to execute the contract within the allotted time frame.
- C. When the buyee acknowledges that the fulfillment of the agreement is not possible due to disasters or other reasons that cannot be helped.
- D. When the buyee receives a reprimand by legal authorities in the form of business cancellation, suspension, etc.
- E. When the buyee receives a dishonorable disposal by a clearinghouse, and arrives at a state of payment suspension.
- F. When the buyee receives the provisional seizure, provisional disposition, and compulsory execution, etc., from third parties.
- G. When the buyee declares bankruptcy, files for liquidation or settlement under the commercial law, the process of corporate rehabilitation law is set to commence, etc.
- H. When the buyee decides to dissolve their company or merge with other companies.
- I. When the buyee acknowledges there is a deterioration of their financial condition or when there is considerable reason to fear it.

- 2) In the cancellation of the agreement established in the preceding clause, the buyer shall have claim on compensation for damages to the buyee.

#### **Section 42 Measures taken when the agreement is cancelled**

- .....
- 1) .....
  - 2) .....
  - 3) .....

#### **Section 43 Agenda**

In regard to doubts in the interpretation by the buyer and buyee related to the regulations of this basic agreement and individual agreements or for items not covered in the regulations, these shall be resolved separately with discussions according to rules of commercial practice and with the spirit of honesty.

#### **Section 44 Governmental courts**

The buyer and buyee agree to have the governmental courts be under the jurisdiction of the 'XX' district court in regard to this basic agreement and individual agreements.

(Place the name of the district court in the 'XX' which is convenient for the buyer.)

#### **Section Special agreement**

This basic agreement shall be applied to individual agreements that exist after its conclusion and to sub-buyees.

#### **Section Validity term**

The validity of this basic agreement shall be from (yy/mm/dd) to (yy/mm/dd).

However, if there is no written objection from either the buyer or buyee as to the continuation of this agreement 1 month prior to its conclusion, this agreement shall be extended with the same conditions for 1 more year and thereafter extended under the same terms.

#### **Section 47 Others**

This contract shall also apply to the sub-buyees

As proof of the approval of this agreement, two sets of this document shall be made with the signature of the signing authority and company seal of both the buyer and buyee, and one copy



shall be held by each.

year/month/day

Buyer: XX city XX town XX number

XX Company limited

The company's official seal is stamped here

Buyee: XX city XX town XX number

XX Company limited

The company's official seal is stamped here

日本資材管理協会の資料に「この契約は丙以下にも適用する」の項目を付け加えたもの

## 取引基本契約書

〇〇株式会社（以下甲という）と、△△株式会社（以下乙という）とは、甲と乙との間に締結される資材、機器、物品売買・または製造委託（修理委託を含む、以下と同じとする）に関する契約に必要な基本事項について、次の通り契約を締結する。

### 第 1 節 契 約

#### 第 1 条 基本契約と個別契約

- 1) この基本契約書に規定する内容は、特約のない限り、この契約に基づく甲乙間のすべての個々の取引（以下個別契約という）について適用されるものとする。
- 2) 甲および乙は、この契約事項のほか甲が提供する注文書に定める事項、および甲が定める取り引き手続きならびに仕様書、図面、規格などに従い契約を履行するものとする。
- 3) 甲および乙は、個別契約においてこの契約に定める条項の一部の適用を排除し、またはこの契約と異なる事項を定めることができるものとする。

#### 第 2 条 個別契約の成立

- 1) 個別契約は、甲よりの注文内容の詳細を記入した所定の注文書と図面、仕様書、規格などによる申し込みに対し、
  - (イ) 乙が甲あてに注文請書を提出するか
  - (ロ) 申し込み後 5 日以内に、乙から受諾拒否の申し出をしないときに成立するものとする。
- 2) 前項（ロ）の期間経過後は、乙は受諾を否定し得ない。また甲は都合によりこの期間内に前項の申し込みを撤回できるものとする。

#### 第 3 条 個別契約の変更

- 1) 甲は、必要により、前条により成立した個別契約の一部または全部を変更または解除

することができる。

- 2) 甲は、前項による個別契約の変更を行う場合は、乙に改正注文書または仕様変更通知書、解除する場合には乙に注文取消書を発行するものとする。
- 3) 甲は、個別契約の変更または解除により、乙が損害を被った場合、乙の申し出により乙の損害を補償する。補償の額は甲乙協議して定めるものとする。

## 第2節 届 出

### 第4条 届出義務

- 1) 乙は、甲との取り引き開始にあたり、次の各号のほか甲が必要とする要求事項を、甲の定める様式により届け出るものとする。
  - (イ) 経歴書 (ロ) 商業登記簿謄本
  - (ハ) 印鑑証明 (ニ) 代金受領印届
  - (ホ) 承諾書(振込支払)
- 2) 乙は、前項により届け出た内容を変更した場合も速やかに甲に届け出るものとする。
- 3) 乙は、第41条の(二)より(リ)に至る各号の一つに該当する事項、その他乙の事業の状態に著しい変動を来すおそれのあるとき、または来したときは遅滞なく甲へ通知しなければならない。
- 4) 乙は、甲の依頼により、甲の定める様式による調査表の提出に協力するものとする。

## 第3節 見 積

### 第5条 見積書の提出

- 1) 乙は、甲の依頼により、見積書を提出するものとする。また甲の要求のあるとき、指示された様式、区分内容に従って見積価格にかかわる内訳を速やかに提出するものとする。
- 2) 乙は、見積に際して、談合その他不正を行ってはならない。

## 第4節 支 給

### 第6条 材料部品などの支給

- 1) 甲は、必要により製造委託に関し、材料、部品、半製品、製品を支給（以下支給品という）する。この場合、支給品の引き渡し場所は原則として甲の事業所内とし、支給に関する手続きは別に甲の定めるところによる。

- 2) 支給品は有償支給と無償支給に分け、その区分および有償支給品の対価は個別契約の都合甲が定める。
  - 3) 甲が支給の目的をもって、甲の指定業者から直接乙に搬入した支給品については、着荷後ただちにその明細を指示した受領証を甲に送付しなければならない。
  - 4) 乙は、支給品を受け入れたとき、遅滞なくこれを検査しなくてはならない。もし支給品に瑕疵を発見した場合は、ただちに甲に通知しその指示を受けるものとする。また工事の途中において瑕疵を発見した場合も該当部分の工事を中止して、上記に準じ甲の指示を受けるものとする。
- 乙が上記の処置を講じないために生じた損害は、すべて乙の負担とする。

#### 第7条 支給品の所有権

- 1) 支給品の所有権は、有償無償を問わず甲とし、また当該支給品をもって制作、加工、修理した製品、部品ならびに仕掛品の所有権もすべて甲に所属するものとする。
- 2) 有償支給品の所有権は、当該支給品による目的物が甲に納入されたとき、甲から乙に移転するものとする。

#### 第8条 治工具などの貸与

甲は、必要により製造委託に関し、治工具、器具、測定具、型などを貸与（以下貸与品という）する。この場合貸与に関する方法、期間、料金および手続きは、別に甲に定めるところによる。

#### 第9条 支給品、貸与品の取扱

- 1) 乙は、支給品および貸与品を善良な管理者の注意義務をもって管理するとともに、甲の承諾なしに支給および貸与された目的以外に、転用ならびに甲の文書による承諾なしに第三者に対し、売却、貸与、質入などの甲の所有権を侵害するような一切の処分をしてはならない。
- 2) 乙は、支給品および貸与品に対し、他との混同を避けるため甲の所有権を明示できる適切な措置を講じ帳簿上も他のものと区分し、その状況を明確にしておかなければならない。
- 3) 乙は、無償支給品の残材、端材、切粉などについて、甲の指示に従って処理するものとする。
- 4) 乙は、甲またはその代理人がいつでも乙の事業所に立ち入り、支給品および貸与品に

ついてその使用、管理状況を調査することを承諾し、かつこれに協力するものとする。

- 5) 甲は、前項による調査の結果改善の必要ありと認めたときは、乙に対し改善の要求ができる。乙は正当な理由がない限り、甲の改善要求を拒むことができないものとする。
- 6) 乙は、支給品および貸与品について、第三者より差し押さえなどの処分を受けたとき、この支給品および貸与品が甲の所有に属することを主張証明するとともにただちに、甲に通知しその指示に従わなければならない。

#### 第10条 支給品および貸与品の滅失毀損

乙はその責に帰す理由により、支給品および貸与品を滅失、毀損し、または盗難をうけ、もしくは使用に不適切とした場合は、甲の指示に従い原状に復すか、代品の提供をなすか、または甲の損害を賠償するものとする。

### 第5節 納 入

#### 第11条 納期

納期とは、個別契約による目的物を甲の指定する場所へ納入する期間または期日をいう。

#### 第12条 納期の変更

- 1) 乙は、納期前に目的物を納入しようとするときは、予め甲の承諾を得なければならない。
- 2) 乙は、納期までに目的物を納入することができないと認めたときは、事前に速やかにその理由および納入予定などを甲に申し出て甲の指示を受けなければならない。
- 3) 甲は、乙の責に帰する事由により、納期までに目的物が納入されず、その結果により甲が損害を被った場合乙に対し損害賠償の請求をすることができる。

#### 第13条 受け入れ

乙は、目的物の納入に際し、甲の納入手続きに従い、甲の指定する場所へ持ち込むものとする。甲はこれを受け入れ、受け入れを証する書面を乙に交付する。

#### 第14条 分割納入

乙は、分割納入の契約または甲の承諾した以外に分割納入してはならない。やむ得ず

分割納入した場合甲は前条の規程にかかわらずこれを預かり保管するが完納を待って受入検査をすることがある。

#### 第15条 納入用書類の添付

乙が、目的物の納入に際し、契約上および仕様書に目的物の納入とともに提出するものと指示してある図面、仕様書、取扱説明書、検査成績書、予備品などを甲に提出しないとき、甲は第13条の規程にかかわらず、その提出がなされるまで目的物の納入完了と認めないことができる。

### 第6節 検 査

#### 第16条 受入検査

- 1) 甲は、前節により受け入れた目的物を速やかに検査するとともに、合否の結果を証する書面を乙に交付する。
- 2) 前項による検査は抜取検査とし、抜き取り、合否の基準など検査に関する事項は別に甲の定めるところによる。
- 3) 乙は、前項によらず、全数選別検査を行うことを要求することができる。ただし全数選別検査を行うことにより増大した甲の検査費用は乙の負担とする。
- 4) 検査の過程において、目的物に生じた毀損などの損害は、甲の責に帰することの明らかな場合を除き乙の負担とする。

#### 第17条 不合格の場合の処置

- 1) 乙は、前条の検査の結果不合格となった目的物について、甲の指定する期間内に代品を納入するか、または無償で修理しなければならない。ただし別に甲の指示があるときはそれに従うものとする。
- 2) 前項による代品の納入手続きは、この契約の定める納入手続きに準ずるものとする。

#### 第18条 特別採用

- 1) 甲は、第16条の検査の結果不合格となった目的物につき、その事由が些細な不備に基づくものであり、甲の工夫により使用可能で、かつ代品または修理提供を求めるいとまがないと認めたときは、契約価格の値引きしてこれを引き取ることがある。
- 2) 前項の値引額については、甲が損害額を勘案して定める。これに対し乙は正当な理由

なしに拒むことができない。

#### 第19条 不合格品および過納品

- 1) 乙は、第16条の検査の結果目的物について、不合格および過納品が生じた場合、甲より通知を受けた日より10日以内に速やかにこれを引き取らなければならない。ただし甲の特別採用および過納品買い取りの場合はこの限りでない。
- 2) 乙が前項の期間内に、不合格品および過納品を引き取らない場合には、甲はこれを乙に返送することができる。この場合運賃その他返送に要する一切の費用は乙の負担とする。
- 3) 甲が第一項の期間を過ぎた後、不合格品および過納品を保管する間に、これらの一部または全部が滅失、毀損、変質したとき、その損害は甲の責に帰する事由によるものを除き乙の負担とする。

#### 第20条 随時検査

甲は、必要により第16条の受入検査のほか、乙の事業所において乙が製造委託による目的物に使用する材料、部品、治工具、器具、設備などにつき、また当該目的物を制作、加工、修理する中間の状態についても、随時検査することができるものとする。

#### 第21条 所有権の移転

目的物の所有権は、第16条の検査に合格したとき、および第18条の特別採用をしたときに、乙から甲に移転するものとする。

### 第7節 支 払

#### 第22条 買掛計上

- 1) 甲は、前21条の所有権の移転がなされた時点で、該当目的物の価格を甲の当月の買掛金高に計上する。
- 2) 甲は、前駆の買掛計上について、計算上毎月一回の締め切り日を設ける。

#### 第23条 支払い

買掛金の支払いは、別に甲に定めるところにより毎月の定支払日にこれを行う。

## 第24条 代金受領

乙は、支払代金を受領する場合、予め第2節により届け出た印鑑を押した受領証を提出するものとする。ただし甲が乙の第2節の届け出により承諾した金融機関に振り込み支払いを行う場合は、受領証の提出を省略することができる。

## 第25条 相殺

- 1) 甲の乙に対する有償支給代金、売却代金など、乙より支払いを受けるべき甲の金銭債権については、甲は該当債権が発生しこれを債権勘定に計上した都度乙に対して有する支払い債務の相当額をもって相殺することができる。
- 2) 前項の相殺により、その都度相殺額について相互の受領証を交換することを原則とするが、甲がその明細を乙に通知することによって相殺することができる。

## 第8節 図面、仕様書など

### 第26条 図面、仕様書などの管理

- 1) 乙は、甲より貸与された図面、仕様書、規程、規格など（以上貸与書類という）については、善良な管理者の注意義務をもって管理するとともに、甲に対し一切の責任を負い、貸与目的完了後または甲が指示したときはただちに返却するものとする。
- 2) 乙は、甲から貸与書類を個別契約による目的以外に使用してはならない。
- 3) 乙は、事前に甲の承諾を得ない限り、貸与書類を複写してはならない。
- 4) 乙は、事前に文書による甲の承諾を得ない限り、貸与書類を第三者に閲覧、貸与、提供などをしてはならない。また甲の承諾を得て貸与書類を複写したのも同じとする。
- 5) 乙は、貸与書類を滅失、毀損し、これにより甲に損害を与えたときは、甲の損害を賠償するものとする。

## 第9節 保証

### 第27条 品質管理

乙は、甲の指示のある場合、製造委託にかかわる目的物の品質維持のため、別に甲の定める品質管理共通仕様書に基づく品質管理体制を確立するものとする。



## 第28条 瑕疵担保

- 1) 甲は、個別契約に保証期間の定めがない場合においても、第21条の規程により、乙より甲への所有権が移転したのち、1年以内に該当目的物に乙の責に帰すると判断される事故の生じた場合は、別途定めのない限り、乙はその負担において甲の指定する期限内に修理または交換するものとする。ただし甲乙いずれかの責によるか不明な場合は、甲乙協議して定める。
- 2) 乙は、前項全段の場合、甲の指定する期限内に修理または交換のできないものについては、当該目的物の代金を速やかに甲に返還するものとする。また甲は修理または交換のほか、甲の被った損害につき甲に対し損害賠償の請求をすることができる。

## 第10節 一般事項

## 第29条 危険負担

第21条の規程により、所有権が甲に移転するまでに目的物の全部または一部が滅失、毀損あるいは変質したときの危

険負担は、別に定める場合を除き次によるものとする。

- (イ) 甲の責に帰すべき事由によるときは甲の負担
- (ロ) その他の事由によるときは乙の負担

## 第30条 制作、販売の禁止

乙は、甲の文書による承諾を得た場合を除き、第三者に対し甲の図面、仕様によるか、または一部を変更した類似品の製作販売を行ってはならない。

## 第31条 直接交渉の禁止

乙は、甲の指示のない限り目的物に関連して、甲の客先と直接交渉を行ってはならない。

## 第32条 秘密保持

甲乙両者は、相互に本契約および個別契約により知り得た相手方の業務上の秘密事項は、契約の有効期限内は勿論、その終了後といえども厳重に保持しなければならない。

### 第33条 工業所有権

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乙は、甲の承諾を得て、製造委託にかかわる目的物を第三者に製作、加工、修理を委託した場合といえども、本契約および個別契約に基づく乙の履行義務は免れないものとする。

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甲は、必要と認めるとき、個別契約にあたり延滞償金付の特約事項を付することができる。

### 第38条 指導

甲は、必要により乙に対し、製造委託にかかわる目的物の製作技術、品質、納期の管理、ならびに設備改善、安全管理などについて、指図または指導を与えることができる。

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甲乙両者は、いつにても3ヶ月の予告期間をもって、この基本契約を解除することができる。

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この基本契約が解除または期間の満了により効力を失った場合においても、現に存在する個別契約については、この基本契約は当該個別契約の存続期間中有効とする。

### 第41条 甲の解除

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(イ) 乙がこの基本契約または個別契約の取り決めの一つにでも違背したとき。

(ロ) 乙が正当な理由なく期限内に契約を履行する見込みがないと甲が認めたとき。

(ハ) 乙が災害その他やむ得ぬ事由により、契約の履行が困難と認めたとき。

(ニ) 乙が監督官庁より営業取り消し、停止などの処分を受けたとき。

(ホ) 乙が手形交換所の不渡処分を受けたとき、または支払い停止状態に至ったとき。

(ヘ) 乙が第三者より仮差し押さえ、仮処分、強制執行などを受けたとき。

(ト) 乙に破産の申し立て、商法上の整理、和議の申し立て、会社更生法手続き開始決定などの原因となる事実の生じたとき。

(チ) 乙が解散を決議し、または他の会社と合併をしたとき。

(リ) 乙の財産状態が悪化し、またはそのおそれがあると認められる相当の事由があるとき。

2) 前項に定める契約の解除は、甲の乙に対する損害賠償の請求を妨げない。

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#### 第43条 協議事項

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この基本契約の有効期間は、平成 年 月 日から、平成 年 月 日までとする。

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本契約の成立を証するため本書二通を作成し、甲乙記名捺印の上各々一通を保有する。

平成 年 月 日

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乙    〇〇市〇〇町〇〇番地  
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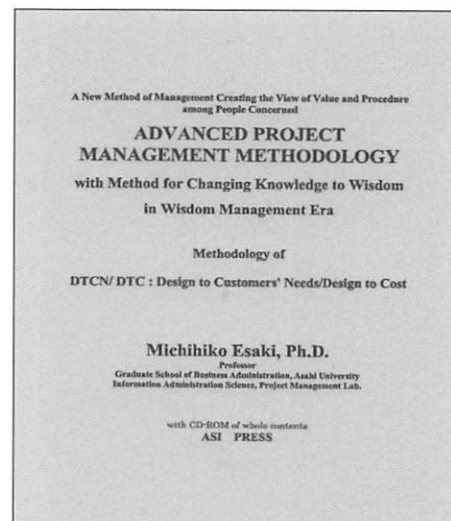
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- E. Key working point to join design matters and cost in Fig.7.2-11, Table 7.2-7, Fig 7.2-6~9
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- G. The combination of the above methods is an effective method (thinking and its procedures) to escape chaos, in Fig.1.1-3
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- O. Training work sheet to create the PMD (Purpose Measure diagram), the entrance method of these methodologies in Appendix M.
- P. Effective use of the question "In order to what", "How to do" and "Why", in Chap.1.3
- Q. The grade of estimate in Project Management phases, in Fig.6.2.3, Fig.2 in Appendix B-1
- R. Avoiding confusion between the terms "Problem" and "Theme/Subject", in Episode 10.
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以下は、川崎重工定年退職後の経歴（1991年以降）

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