

5.2 How to use a price/cost breakdown table for cost control

5.2.1 Introduction

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5.2.1 Introduction

This section describes the objectives of a price/cost breakdown table and how to use it effectively in cost control.

5.2.2 What is a price/cost breakdown table ?

A price/cost breakdown table (Figure 5.2-1) shows the details of a product, or the product's component prices and process costs.

To clarify or try to clarify the details of price and cost, the table provides a map and scale, or a draft plan for all the fields where reasonability is required, such as technique, quality control, cost control, cost itself and production span. When this is further divided to clarify the details of cost, the table:

- (1) provides a map to check any cost mistakes (i.e., the cost is too high or too low) and any room for improvement, and
- (2) provides a map and scale for cost control

Subsections, 5.2.3, "Price/cost breakdown table to understand cost" and subsection 5.2.4 "Price/cost breakdown table to provide room for cost control" will describe the way of thinking and viewpoints for (1) and (2).

5.2.3 Price/cost breakdown table to understand cost

The price/cost breakdown table indicates the details of a price and its effect in any situation where price reasonability is required. To concentrate on the points of the table, this subsection describes the effectiveness of the table in understanding cost, and eight principles for

understanding cost. The basic thinking behind the eight principles is based on the doctrine of the DTCN/DTC methods, that is, "the utmost purpose of an enterprise is to create customers; to create customers, the enterprise must survive; and to survive, it must earn a reasonable profit." It is also based on the thinking of the steplist for a reasonable price.

When the price/cost breakdown table is used on the basis of this thinking, prices and costs can be understood by recognizing and introducing the following 8 principles:

First principle

Most of the cost of a product consists of labor cost, appropriate profit, and a small sum of tax, excluding raw minerals and ore that can only be purchased at the market price.

Second principle

It is always possible to find an reasonable cost through "reconsideration", taking account of wage increases. The following explains why and outlines the measures to find the reasonable cost:

- (1) Some cost estimates may be on the safe side, whereas others may include missing costs. The missing costs must be recovered.
- (2) Cost is improved as time passes, without exception. In particular, because risk cost is removed after completion of a prototype and when production has stabilized, the total cost can be reconsidered and improved (based on the thinking of a steplist for a reasonable purchase price).
- (3) Closely examining the details of price and cost using a price/cost breakdown table yields several views. As for man-hours, on which labor cost is based, Figure 5.2-2 shows a learning curve indicating the relation between production quantity and man-hour reduction.

There are the following 2 views of the estimated man-hours using the learning curve.

Estimated man-hours using the learning curve, starting from initial results (curve from the direction of A in figure 5.2-2)

Estimated man-hours using the learning curve, starting from standard manhours (bottom of learning curve) (curve from the direction of B in the figure 5.2-2)

Based on the above views, A, and B, C, and D in Figure 5.2-2 can be explained as follows:

A: Man-hours after sufficient reduction, or when work contents are well known and controlled. According to the late Hisaichi Yano of the Japan Defense Agency, who proposed the man-hour learning curve rate, the learning curve rate should be used only when the man-hours are not

known.

B: The difference between the standard man-hours (bottom of learning curve) (A) and estimated man-hours when a certain Serial is set as the bottom of the reduction and man-hours are returned to younger Serials by a learning curve.

C: Remainder after subtracting A and B from the actual result line (almost any cost collected from an actual site ("Genba") can be said to not have been sufficiently improved), from the viewpoint of exhaustive cost reduction.

D: Remainder after subtracting A from the actual result line (result in C).

D is the "difference of information" for finding a reasonable cost. Negative D indicates that man-hours have been greatly improved over standard man-hours. Positive D indicates that there is room for improvement.

The positive D is viewed as including insufficient control or effort. The review, or cost reduction, can be processed according to the following principles, and actualized according to the 3-5 phase improvement method.

Third principle

It is always possible to obtain, prepare, or investigate a price/cost breakdown table for any object when the following conditions are met:

- (1) There is no in-house or intra-organizational obstruction to providing and investigating a price/cost breakdown, as long as there are reasonable purposes and standpoints, and
- (2) The basic material contract transaction (see Material 5.2-1) has been concluded.

This contract is usually concluded when Japanese corporations make a transaction. Article 5 allows for a request for a price/cost breakdown table, and Articles 20, 27, and 38 allow for an investigation at B's facilities. Investigating the price/cost breakdown table provides a map that indicates which part of the cost can be examined and improved through the cooperation of both parties (Material 5.2-2 indicating the notification of the Ministry of International Trade and Industry on the next page of Material 5.2-1 is the guideline for examining and improving the cost between companies).

(When an enterprise, such as a trading company, exists between the purchaser and the manufacturer, Article 20 of the contract should be revised so that it also applies to the third party and so on.)

Fourth principle

Before requesting or "reconsidering or reviewing" a price/cost breakdown table, it is necessary to reach an agreement on the reconsideration for review policy as in Table 5.1-4, or the estimate conditions for reviewing the product price, as in Table 5.1-5. This is essential for directing subsequent jobs and avoiding possible disputes.

Fifth principle

A price/cost breakdown table for each part or process will provide technical experts on general processes with a map for looking through and understanding the detailed purchase part and the man-hours of the process to be improved.

It also helps us:

- (1) approach problems and find solutions by assuming numerical gaps to be technological gaps (note: the technique includes control or management technology),
- (2) detect processes containing unnecessary man-hours, and
- (3) compare "similar parts" more easily.

(Note) The following story exemplifies (1) (See Figure 5.2-3).

A price/cost breakdown table showed that the process of cutting a 1 inch diameter steel rod required 1 man-hour. Although the experiences of the author suggested that the work required 10 to 15 minutes at most, he did not immediately discuss the matter, but investigated the field site of the process. As a result, it was shown that the steel rod was cut with a reciprocating metal saw instead of the cutting-off tool of a lathe. As shown in this example (Fig. 5.2-3), a numerical difference in the estimate of man-hours becomes evident when there is a difference in technology.

Sixth principle

The most important principle when a problem is detected or suspected after reconsidering or reviewing a price/cost breakdown table is to observe the field side (genba) or facilities and make an opinion based on observation without requesting an explanation of the problem. It is an important principle to start from an opinion based on the field (genba) site and have frank discussions about the possible improvements.

Treating the problem from the opposite process direction will lead to unproductive disputes, failure, or bad relationships (See Figure 5.2-3 left side "bad approach process"). To start from observation at the field (genba) site is an absolute principle.

Seventh principle

The final reasonable price is obtained from the following formula:

Final reasonable cost = { minimum standard cost } \pm overall adjustment factors

Minimum standard cost: minimum cost that can be understood

Overall adjustment factors: factors to be taken into account of the period and plant rate of operation before the minimum standard cost is obtained

See Section 5.3 "Price Determination Criteria" for the overall adjustment factors.

Eighth principle

A reasonable profit added to the final reasonable cost is essential for a company to survive. When a project cannot keep a reasonable profit due to competitive market prices, the impartial profit or transitional negative profit must be allocated to each party before getting reasonable profit. When there are no future prospects of reasonable profit, the project must be discontinued.

5.2.4 Price/cost breakdown table to provide room for cost control

Cost control is adjusting various costs in order to manage a company or implement a national budget. Cost control is easy when each cost is accurately understood. The previous subsection described how to use a price/cost breakdown table to understand costs. This subsection describes the clues for using the price/cost breakdown table for cost control.

Table 5.2-1 exemplifies the checklist of purposes to make a price/cost breakdown table in cost control. Table 5.2-2 is the checklist for cost control original check.

(1) Summary of a price/cost breakdown table as a place to give keys to controlling costs

A price/cost breakdown table that reveals cost details in numerical values is effective in any field where reasonable costs and prices are required.

Because the price/cost breakdown table can express cost factors of processes, parts, or functions using numerical values, it can provide the place and scale for cost control by the following:

The cost factors, when expressed using numerical values, can be compared with standard or

empirical values, or those obtained in other companies or at other job sites.

The difference obtained by the comparison of numerical values can be considered to be the difference in technology, control level, or way of thinking, and can be the starting point of an approach (the difference in technology includes that of cost control technology).

As for the compared numerical values, the difference can be considered the possible width of improvement. The rate can be considered the possibility of realizing the improvement.

The difference and rate obtained from the comparison can be used as the order of the improvement work, and as the parameter that indicates the investment limit for the improvement.

To make the price/cost breakdown table effective as a method of cost control, the "preparation of estimating conditions" or "estimate condition specifications" have to be decided according to the following criteria:

Cost may vary according to standpoint, time, conditions, criteria, and other materials as time passes.

Therefore, to make the price/cost breakdown table effective as a contact of cost control, it is necessary to clarify the purpose and preconditions for making the table. Then, based on mutual agreement, improve the matter or thing.

When the stepwise preparation and use procedures of the price/cost breakdown table are considered from the above viewpoints, the "steplist for cost control procedures" and the "steplist for budget preparation procedures" can be formed.

(2) Preparation of the price/cost breakdown table for cost control and the steplist for the procedures to use the price/cost breakdown table

The steplist in Table 5.2-3 summarizes the general procedures for preparing and using the price/cost breakdown table for cost control.

5.2.5 Discussion

This section discusses the way of thinking of a price/cost breakdown table for a case in which an agreement was reached concerning wage rate. However, because the calculation of the man-hour rate is affected by the plant's rate of operation, the wages of the laborers, and the

plant equipment amortizing cost, the calculated man-hour rate is not always applicable (also due to the competition with other companies in the same industry). This may affect actual price determination. It is necessary to refer to the cost calculation manual for each industry (such as the airplane manufacturers' cost calculation manual; Japan; 1959) to calculate man-hour rates.

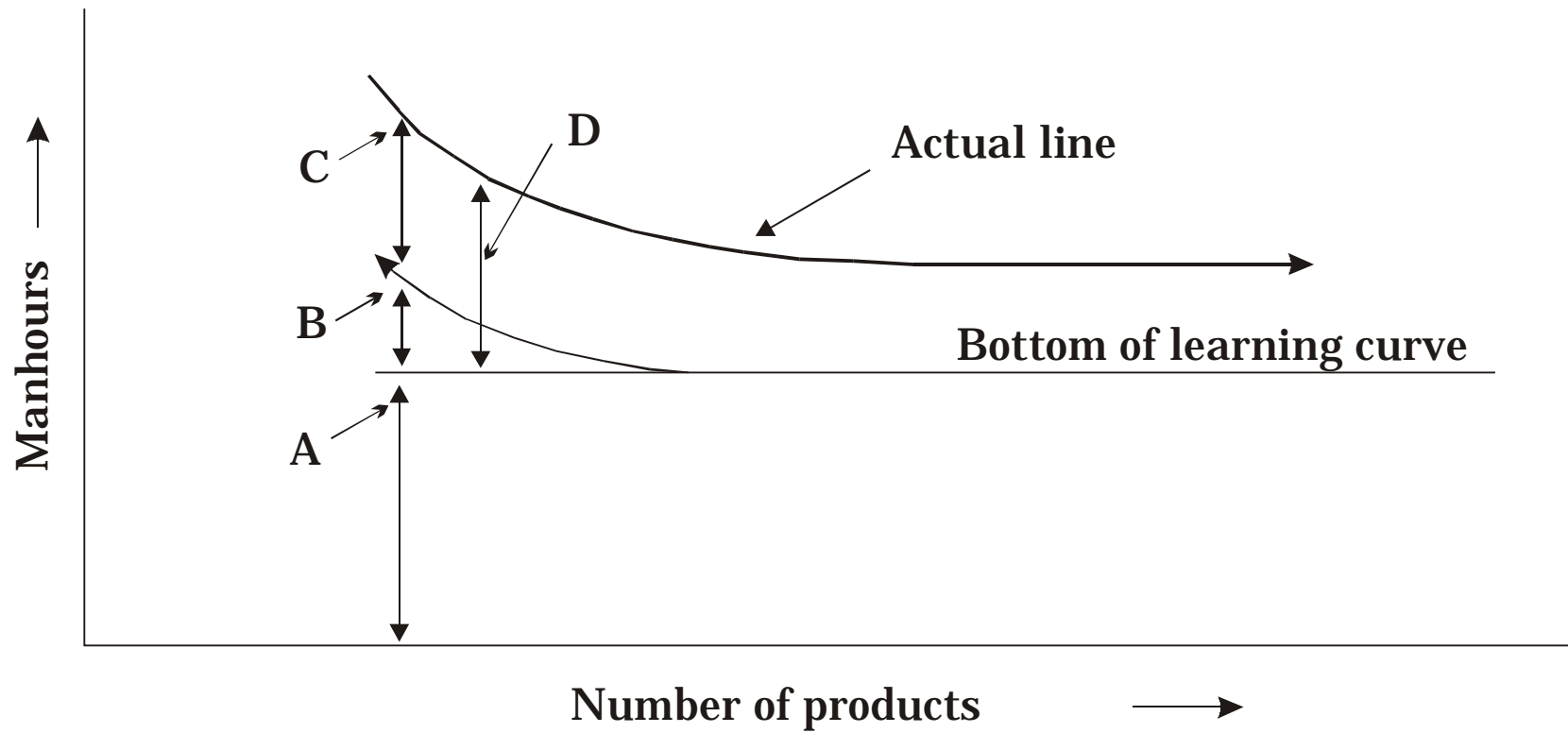
Fig. 5.2-1 Price/cost breakdown table

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Prepared by : _____ Purpose prepared : _____ Caution : _____
 Part No. _____ Part Name _____ Manufacturer _____ Referenced Document _____ Grade of Estimate: _____
 Note:(1) Category means machine & assembly. (2)(3) enter standard M/H. (4) Learning coefficient, burden factor, the coefficient of difficulty/easiness and current direct labor rate are to be multiplied by standard M/H, and explanations of the content of coefficients are to be made as attached data. Date : _____

Item No.	Breakdown sequence (GOZINTA)	Part or process No.	Nomenclature	Qty/swt	Eng. Code	Direct material cost						Processing Costs			Outside Processing Cost	Cost of development or tools & equip.					
						Material Description	Unit	Standar Qty	Unit Price	Material Cost	Purchase Part Cost	M/H				Processing Cost	Item name or tool & equip. No.	Price or expense	Amortizing Number	Average amortized expenses	
												Category(1)	Set(2)	Run(3)							
		Net Amount																			
		Excess(%)																			
		Total																			
Royalty				Delivery Cost				Others				Total				Grand Total					
_____				_____				_____				_____				_____					

Fig. 5.2-2 Two ways of looking at the learning curve



Reference material 5.2-1: A extracted Example of Basic Contract of Material Transaction prepared by Japan Purchasing Management

BASIC CONTRACT OF MATERIAL TRANSACTION

AA Co, Ltd,(hereinafter called A) and BB Co, Ltd,(hereinafter called "B") agree here as follows concerning to the basic items which are required for the contract of sales of material, equipment, and parts or consignment manufacturing (including consignment repair; same in the following).

SECTION I CONTRACT

Article 1 Basic Contract and Individual Contract

1) The details specified in this Basic Contract shall be applied to an individual transaction (hereinafter called "Individual Contract") based on this contract between A and B unless otherwise specified.

2) A and B shall fulfill the contract according to the terms of orders placed by A and the dealing procedures, specifications, drawings and standards specified by A in addition to the terms of this contract.

3) A and B may exclude a portion of this contract or determine other terms than this contract in Individual Contracts.

Article 5 Submission of Quotation

1) B shall submit quotations at the request of A. And when requested by A, breakdown details of the quoted price shall be submitted promptly according to the forms requested by A.

2) In case of quotation, B shall not make any unfair action such as consulting before the bidding and other matters.

Article 20 Inspection on Demand

If required, A may perform Inspection on Demand, in addition to the Acceptance Inspection mentioned in Article 16, of material, parts, jigs and tools, equipment, facilities and so on which are used for the items of consignment manufacturing, and even of the way of manufacturing, fabrication or repair of the ordered items at B's manufacturing facilities,

Article 27 Quality Control

When requested by A, B shall establish the Quality Control system to maintain quality of consignment manufacturing items according to the common quality control specification separately specified by A,

Article 38 Instruction

When it is necessary, A may indicate or instruct B in manufacturing technique, quality, delivery control, facility improvement and safety control etc. on the object items contracted.

Reference Material 5.2-2: Extract of Promotion Standard based on Subcontractor and small Business Promotion Law Article 3, Paragraph 1.

**Promotion Standard
based on Subcontractor and Small Business Promotion Law
Article 3, Paragraph 1**

June 11, 1986
Advisory No.209 issued
by Ministry of International Trade and Industry

No.3 Items relating to modernization of facilities, improvement of techniques and mutual collaboration among subcontractors.

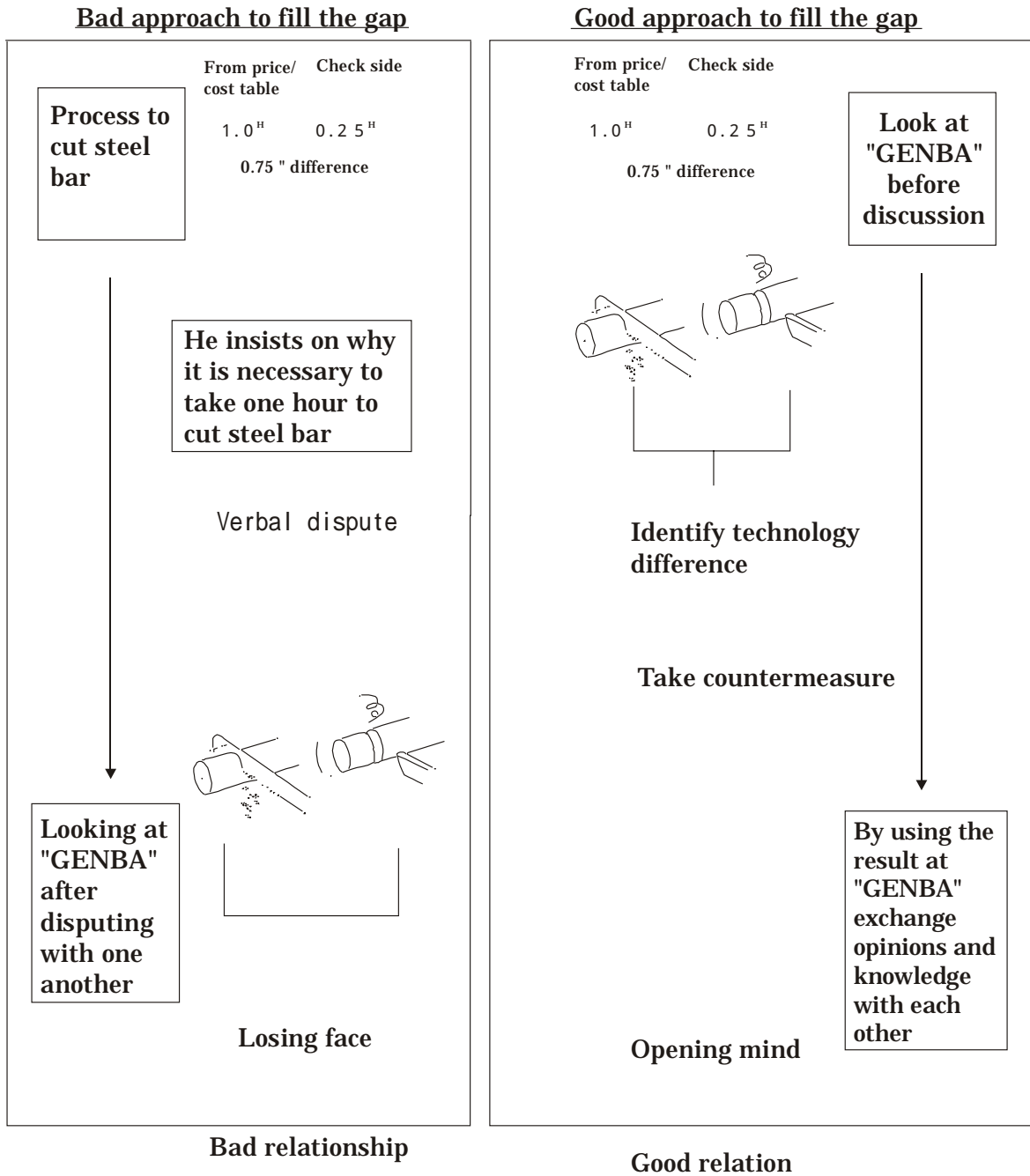
- 1) Modernization of facilities
- 2) Improvement of techniques
- 3) Modernization of management control etc.

(1) Subcontractors shall make an effort to modernize management control and labor management by adopting an effective management method which is adequate to the actual situation of corporation management such as establishment of management plan for long range, management policy, profit plan, funding plan, facilities plan, production plan and so on, and to conduct value analysis and numeric management control system.

No.4 Items regarding the improvement of pricing method, delivery inspection method and other dealing conditions.

- 1) Improvement of pricing
 - (1) Dealings price shall be settled by negotiation between subcontractor and parent contractor based upon reasonable calculation method to include proper amount of profit with consideration of quantity, delivery, payment, quality, material cost, labor cost, other expenses and market price trend.
 - (2) The above-mentioned negotiation shall be made periodically for the items of continuous orders, or whenever orders are placed for the items of non-continuous orders. A record of such negotiation shall be kept by both parties.

Fig. 5.2-3 How to comfortably fill the technology gap difference which is found using price/cost structure table



**Table 5.2-1 Checklist of purpose to make price/cost breakdown table
(Contents will vary depending on the purpose)**

<p>1 .For outside use</p> <ul style="list-style-type: none"> (1) To obtain the budget (2) To decid sales price (3) To propose a preliminary estimation for customer (4) To explain or understand the practical result of the present status <p>2 .For inside use</p> <ul style="list-style-type: none"> (1) To proceed “design to cost” (2) To proceed design value analysis (3) To select vendor (4) To decide inside production or outside production (5) To sum up or allocate the budget (6) To decide and manage the target of each assignment or working group (7) To create a place to do the following jobs: <ul style="list-style-type: none"> a . To express the process in numerical form in order to analysis and make improvement b. To find waste by expressing the process and cost in numerical form c. To analyze manufacturing engineering problem d. To analyze how to keep the rate of operation of each working place e. To compare with standard superior benchmark f. Comparison of companies g. To establish parameters to allocate jig cost etc. for improvement (8) To allocate the target
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Table 5.2-2 Cost control original check

<p>The baseline of cost control is to control the following four(4) items from the standpoint of profit ratio over operating capital.</p> $\text{Profit ratio over operating capital} = \frac{\text{Profit}}{\text{Operating capital}}$ <p>(Operating cost is the sum of current assets and fixed assets)</p> <p>1 .How to reduce the fixed cost in total cost</p> <ul style="list-style-type: none"> Ex. a. Sell surplus equipment (Reduce the depreciation ratio) b. Reduce or move unnecessary staff c. Reduce overhead administrative expenses <p>2 .Reduce recurring costs</p> <ul style="list-style-type: none"> Ex. a. Change transportation vehicles (air sea, sea air) b. Reduce the operating costs of manufacturing c. Reduce material costs by improving material layout d. Reduce cost by changing design e. Reduce waste <p>3 .Reduce fixed asset ratio or obtain profit</p> <ul style="list-style-type: none"> Ex. a. Sell surplus equipment b. Reduce inventory(safety stock) <p>4 .Reduce variable/current assets</p> <ul style="list-style-type: none"> Ex. a. Collect bills quickly, reduce credit b. Rotate stock quickly and reduce inventory c. Reduce making span

Table 5.2-3 Steplist for making and using price/cost structure table to proceed with cost control

Phase No.	Step	Step contents	Input		Output		Notes	Output approval level
			Item	Pre-assurance activity	Item	Post-assurance activity		
I	Planning phase by price/cost structure table	Objective concept to make price/cost structure	1.The purpose 2.The object 3.The target	1.Use cost control purpose checklist 2.Use of this steplist	1.Specifications and conditions to make price/cost structure table(draft) (Estimate conditions)	1.Start to partially fill in the price/cost structure Table 2.Check by cost control purpose checklist		
II		Conditions to make price/cost structure table (Conditions to estimate)	1.Specification and conditions to make price/cost structure table(draft) (Conditions to estimate) 2.Material which can be obtained	1.Extract and adjust the problem and conditions to make price/cost structure table 2.Identify data level(which will show WBS level) 3.Use grade of estimate 4.Use design steplist 5.Use reasonable price steplist 6.Choose the practical result record or just the estimation	1.Specification and conditions to make price/cost structure table (Estimate conditions)	1.Fill in the format	1.Agreement or decision must be made about specifications and conditions by; a Agreement among related people, or b. As the policy of the highest level person	
III		Procedure for making	1. Specifications and conditions to make price/cost structure table(draft) 2. Format of price/cost structure table	1.Fill in the following items in price/cost control table; a The purpose b The standard reference c Caution(e.g. for outside or inside company)	1.Cost item level 2.Detailed level of cost items 3.Who is responsible for that cost item and its contents	1.Follow the policy to fill in the price/cost table depends on the purpose	1. The meaning of "who is responsible to that cost item and conditions" is what group is responsible, e.g. a Design group, or b Manufacturing planning group	
IV		Procedure for making details	1. Cost item 2. Detailed level of cost item 3. Who is responsible for that cost item and its contents 4. The purpose	1. In order to attain the target, review and adjust who and how to make price/cost table	1. Summarized policy who will fill in the data of each item 2. Price/cost table making schedule	1. Follow the policy of data a Standard manhours b Resultant manhours c Allocated manhours d Similar part cost e Book value f Year price	1. As necessary, each data has to be accompanied by e.g. a Safety factors b Improvement rate c Margin	
V		Work to make price/cost structure table	1. Data policy 2. Who is responsible to fill in the data 3. Schedule	1. Make price/cost table of company	1. Specs. and conditions 2. The data-filled price/cost structure table 3. Focus point to attain the target	Compare data with; 1. Standard cost list 2. Function cost list 3. Market cost list	1. After comparison of data; a The larger the ratio is, the easier it is to improve b The larger the difference is, the greater the improvement Therefore, focus on the larger priority of a or b	
VI	Cost control phase	Cost control action by price/cost structure table(Plan)	1. Specs. and conditions 2. completed price/cost table 3. Focus to realize the target 4. Review policy	1. Identify starting focus is to starting focus to be start with difference between sum of the price/cost table and target cost.	1. "Do" cost control policy 2. Action item priority 3. Extracted conditions to proceed 4. Schedule 5. Allocation of assignment	1. Use the difference and ratio priority to proceed 2. Raise the adjustment level if lower level Management has difficulty adjusting the conditions to proceed the project	1. Example how to decide priorities; a. Difference priority + ratio priority = "Do priority" b Add the weight of importance to the items, as necessary	
VII		Implementation of cost control(Do)	1. "Do" cost control policy 2. Action item priority 3. Extracted conditions to proceed 4. Schedule 5. Allocation of assignment	1. Proceed "Do" of cost reduction or cost control work	1. Attain ratio % of each implemented work item	1. Evaluate the attained Result 2. Compare with other Results of cost reduction or cost control activities		
VIII		Result review of cost control (See-Check)	1. Ratio % of implementation result 2. Evaluation of ratio % 3. Comparison result with other cost reduction/cost control activities	1. Find the problem and engineering work from the difference of compared ratio % and make a plan to resolve it	1. The still unsolved problem and priority 2. Next countermeasure 3. next step schedule	1. Improve countermeasure 2. Accumulate the learned results as a base of know-how	1. If a big problem still exists, return to appropriate step above	