

Chapter 5

Reasonable Purchase Price and the Criteria for its Determination

(Knowledge of Reasonable Purchase Price)

Abstract

This chapter describes a basic view of the reasonable purchase price required in the DTCN/DTC methods and the criteria for determining it.

The basic view includes:

1. Steplist for a reasonable purchase price

What determines a reasonable purchase price ? This is a practical article published by the author in 1973, and is the origin of all the activities connected with developing the methods described in this book.

2. How to use a price/cost breakdown table for cost control

Appropriate and reasonable cost control requires that we know the details of the keys. A price/cost breakdown table provides the details. This subsection describes the requirements for a table, how to make, use, and check a table, and important principles.

3. Price determination criteria

Whereas subsection 1 describes the step-by-step method for determining a reasonable price, this subsection describes more general and fundamental criteria for determining a reasonable price.

Chapter 5.

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5.1.5 Discussion

5.1.1 Introduction

(1) In response to the questions, "What is a reasonable purchase price, and what determines it? ", this section introduces the way of thinking to practically justify a new price when the old price must suddenly be changed after reconsideration.

(2) Taiichi Ideriha and the author jointly created and published this way of thinking in the proceedings of Society of Japan Value Engineers in 1973. This way of thinking is the origin of the methods introduced in this book and is the starting point for all the techniques in the DTCN and DTC methods. Although it contains some things which are difficult to understand, it is introduced to reflect the social thinking in 1973.

There have been discussions on how to introduce value engineering methods into enterprises. Investigators have reported that "it is important to obtain the direction and understanding of top management," "experiences are essential for understanding VE," and "the method for persuading the top management to introduce VE must be taken into account before proposing VE."

Lawrence D. Miles stated in Chapter 11-6 of his book "Techniques of Value Analysis and Engineering," his point of view with respect to "minimizing the risk of personal loss":

Minimizing the Risk of Personal Loss

A series of research studies brought forth the surprising information that most decisions are made on the basis of avoiding or minimizing personal losses, such as reduction of authority, dismissal, or embarrassment. This finding seemed so improbable and so startling that it caused the writer to think back through several of his most difficult decision-making experiences, especially a considerable number which he knew were wrong, but which "had" to be made in a certain way. Surprisingly, every one of these decisions was made to avoid or minimize personal loss. Again it is suggested that the reader stop to reflect on and analyze some of his own decision-making experiences before proceeding.

A few examples of situations in which the danger of suffering personal loss occurs may further illustrate the point in question:

A purchasing agent may for years have purchased a product from one supplier, even though this supplier may not have kept pace with either technical progress or value innovation. A decision by the purchasing agent to change over to what seems to be a better product at a lower price brings immediate danger of personal loss. Every change brings risk.

The engineer who traditionally used a certain type of assembly for accomplishing a certain function and has decided to change to the use of what he believes to be a simpler, more reliable, and certainly much more economical assembly is certainly taking a chance of personal loss. So, in order to reduce the cost dramatically, it is important as a first step "to take every measure possible to minimize fear of embarrassment or personal loss which comes, or may come" as these fears are apt to cause opposition to the change.

From this viewpoint, measures to prevent personal loss resulting from a sudden change in price were considered, and the framework of the following "Steplist for a reasonable price" was created (Note 1). Because the steplist seemed to be able to not only prevent loss, but also allocate staged decisions from various grounds, it was enlarged to the management control cycle of new products in mass production.

(Note 1) Needless to say, "the case where the way of thinking introduced here can be applied partially and as a whole" is limited to "the case where the way of thinking is accepted by both parties as the relation of offer and acceptance."

5.1.2 Viewpoints for preventing personal loss

A reasonable price steplist was prepared in the following situation. When an enterprise examined the possibility of reducing the cost of their products, the price of the product could be reduced by about 90% after simple examination. The author was consulted by the Senior Manager of the Purchasing Department. (Disclosure of this fact would cause criticism about their work as well as of the person in charge and his/her superior.) The Senior Manager of Purchasing Department needed to explain the reduction in price in a reasonable way. In other words, the price could not be reduced unless the loss of the authority of the persons in charge was prevented. The author, therefore, used the following very general viewpoint to solve the problem. That is, the viewpoint, "discussing from future results side is much easier than discussing from past side in details" was used.

The original price, which was 10 times higher than the reconsidered price, was based on insufficient information at the time that it was decided. The price was reduced because the production line stabilized and more information was obtained. The reconsidered price does not acknowledge the presence of a contract specifying that no mutual price reconsideration will be performed.

This way of thinking can be theoretically explained if price reconsideration over time is stratified. That is, the loss can be prevented by proving the time sequence of the previous and new figures. This theory is affirmed by those who understand that everything has to be reconsidered and that a decrease in unknown elements may result in unexpected outcomes. Therefore, the purpose of publishing his paper is to remove the useless resistance to drastic cost reduction, which seems discontinuous with the previous phase.

5.1.3 The way of thinking for a reasonable purchase price

A reasonable purchase price is decided based on the relationship between offer and acceptance [Note 2]. The price becomes the knot of cooperation between the purchaser and supplier. The general background factors of the offer and acceptance include the following facts:

- (1) No enterprise can purchase products unless their prices are agreed on.
- (2) The function and price of a product purchased by an enterprise must be socially related to those of the upstream product or system produced by the enterprise.
- (3) In the above framework, a reasonable price must be based on business trading principles beginning with the offer including reconsideration.
- (4) The price initially agreed on by both the purchaser and supplier within a limited time should be reconsidered within a limited period if the price is found to be unfair or partial.
- (5) When it becomes evident that the system project cannot be continued as a result of reconsidering the price, and in spite of various overall examinations, adjustments, or actions, the project is socially useless. Replacing the project or discontinuing it should be examined.

Figure 5.1-2 shows the above relations..

(Note 2) The Uniform Commercial Code in the United States (U.C.C.: something like a combination of commercial and civil law in Japan) best covers the relations between Offer and Acceptance from a business trading viewpoint. Figure 5.1-3 shows Article 2-206, which is the basis of the Code. This is essential in trade with US companies and is also helpful in Japan.

5.1.4 Steplist for a reasonable purchase price

The previous subsection described the basic way of thinking about a reasonable purchase price. If we make the step breakdown of the process from the concept of a product to its production phase, we can recognize the process in which the viewpoint of evaluation and judgment to look at things will vary considerably from a vague stage to a confirmed stage.

Figure 5.1-1 shows the steplist for a reasonable purchase price. The relationships of reasonability in the above evaluation and judgment standard about a reasonable price were broken down into steps, and the contents of each step were divided into inputs and outputs. The relationships of reasonability in each step were arranged so that the output in a step would be acknowledged before proceeding to the next input.

This steplist is divided into the following phases:

- (1) Concept phase
- (2) Breakdown phase
- (3) Implementation phase
- (4) Steady phase
- (5) Review phase

Although the steplist starts from the concept phase of a new product, any phased step can be used to examine the price. Moreover, any phased step can be used for purchasing any product by adjusting the content of each item. Furthermore, the following principles can be derived using the steplist:

- (1) When it is necessary to reconsider or review a product already in production through VE examination, the review work should start by reaching an agreement on preconditions before reconsideration or review work is done. Figures 5.1-4 and 5.1-5 are examples of the pre-condition discussion and agreement for the reconsideration or review. Format A is designed for a product to be developed and Format B is for review of a developed product.
- (2) When there is compensation for results gained through reconsideration or review work in cooperation, it is better to determine each receiver's share by the degree of contribution and utility after the result is obtained (it is also possible to pay compensation as a reward for reconsideration-related labor). The discussion, or the share or the compensation before a result is obtained may shift the point of discussion to deal with the share of the result. This may lead to withholding good ideas to get a good result. Therefore it is enough to discuss the share of the result after a good result is obtained.

5.1.5 Discussion

The above subsections mainly describe the history of the steplist for a reasonable purchase price. Because the steplist was developed for a specific product, it would be necessary to adapt it to meet the needs of each industry.

The author would be happy if the steplist helped various optimization activities in the present changing management environment.

See Subsection 1.2 "Decision-making mechanism by information of difference" and Subsection 5.2 "How to use a price/cost breakdown table for cost control" for the method to compare similar products, the essentials for the condition of estimate specifications, and the requirements for a price/cost breakdown table.

References

[1] The United States UCC (Uniform Commercial Code, 1958-1968) accepted in each state of the United States

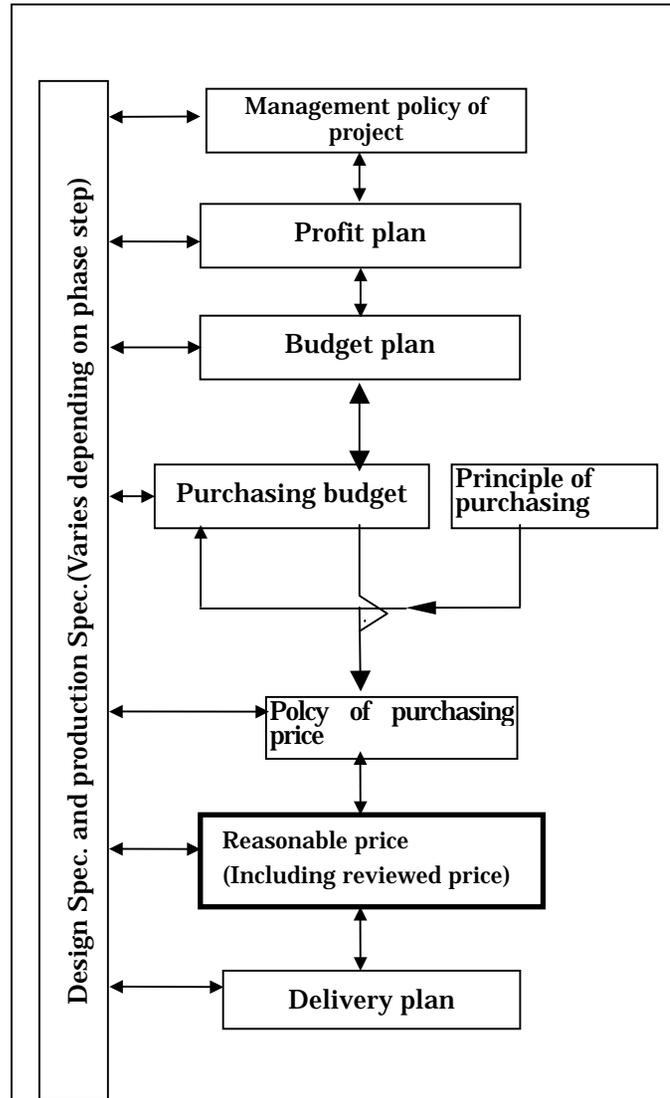
Fig. 5.1-1 Steplist for a reasonable price

(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 phase	Definition of task requirements	Selected item subject to purchase or system (Eng.)	Choose person who takes care of settling company's international matters & person related in each department	<ul style="list-style-type: none"> Specification of our company(draft)(Eng.) Specifications of estimate terms and conditions (Production and Material Dept) 	Check contents of spec. according to checklist. Approve the terms and conditions of estimation			
	Selection of applicable vendor for estimate (Qualitative)	List of applicable vendors and part No. Specifications of our company(draft) Terms and conditions for estimation	Advertise for applicable vendor (domestic and foreign) Review vendor's year book Send RFP to applicable vendor	Vendor's Specifications Vendor's estimation ()	Evaluation of vendor's design/production facility Evaluation of vendor's financial ability		Evaluation of ability is to be made according to past & present business accomplishments	
	Evaluation of fulfillment for price & engineering requirements	Vendor's specifications(draft) Vendor's estimation() Budget/target price Data for similar item (specifications and price)	Review specifications and estimation.	Combine specification of our company & vendor. Vendor's re-estimation with price & cost data () Implementation plan Preliminary test plan (as required) Comparison table of potential vendors.	Evaluate the technical & financial accomplishment for requirements. Check if the product already on the market Compare with master schedule & see if there is enough time. Clarify critical path Make comparison worksheet for final selection of each purchase part item.	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 phase	Selection of vendor	<ul style="list-style-type: none"> Combined specifications of our company and vendor Vendor's second estimate () Schedule (draft) Plan for preliminary test (as required) Comparison worksheet for final selection	Examine of requirements by functional test and inspection of initial product; Q/T, FAL Examine patents Negotiate the price and fix the quotation	Preliminary selected vendor Final specifications Implementation plan (draft) Final quotation () (According to nego result) Price and cost data and table ()	To check adequacy (Major assurance) Check that price & cost table data are consistent by sampling (use technique of sampling, similar part, weight, etc.)		Take contingency plan leading up to first delivery of lot 1 & other risks.	
	Placing order and carrying out plan	Implementation plan Final quotation ()	Final negotiation prior to contract (delivery term, price etc.) Examination of final quotation	Purchase order Actual schedule up to delivery date of first lot.(including functional test & inspection requirements for initial product; Q/T, FAL	Make contract Check detail schedule(to clarify critical path) Make periodic report for schedule, and determine who is responsible at each checkpoint of schedule.	Similar price Budget price Arranged price Price & cost analysis	To clarify the division responsible & person in charge when follow-up is scheduled.	
Implementation phase	Stage in practice up to delivery of first lot	Submitted manufacturing schedule Engineering design Actual manhour Grasped achievements for standard amount of material Price cost table () Terms and conditions of estimation()	Obligate vendor to prepare cost data of lot 1 and 2 Determine processing man-hour by dividing into SET & RUN	Standard manhours on mfg. shop order Product result Item to be improved Manufacturing problem, Performance and the improving schedule Price & cost data table by actual result()Divide into non-recurring & recurring expenses)	Check the result according to checklist Select of drill-check point. Clarify the item(draft) for improvement.(Estimate necessary amount money for improvement) Decide which price system can be taken "fix price or lot size pricing" (See remarks)		Review and determine the necessary matter between our company and vendor, and the engineering and purchasing person in charge to summarize the actual result in manufacturing and performance. Apply the learning curve. Take corrective action for material and parts by actual measurement & actual purchasing price. Clarify process cost by the difference between actual and the standard time. In lot size pricing, the price is decided according to the lot size ordered in proportion to non-recurring & recurring expense.	
Steady phase	Stage where stabilization begin after lot 3. Re-evaluation for reasonable price	Schedule to put into practice the draft for improvement of production Extraction of controversial points from contingency standpoint Terms & conditions for improvement () List of what prices are consistent () Data to review establishment of price & delivery terms	Proceed technical survey Calculation of standard manhours Check and find the difference in technique by comparing standard manhours between two vendors.	Periodic report of the results executed for promotion. Established practical method by eliminating the contingency factors. Examined result by our company of the price, cost data, profit & re-establishment of unit price as required Established schedule to proceed annual review	Review the result by specialist Refer to standard quality Check according to checklist Equalization of profit Decide the theme to be reviewed annually Establish VA plan to proceed	Price standard manhours x rate + C.C.I.P Use cost analysis technique Use learning curve costing technique.	(Check according to cost analysis technique by using cost and price breakdown table)	
Review phase	Annual review & stage of analysis)	Submitted theme to be reviewed Submitted items to be examined with VA contract Policy and examination of design changes	Settle the contents of VA contract Settle the contract Design changes as necessary	<ul style="list-style-type: none"> Items put into practice as a result of review Summarization of VA. activity results. Enforcement schedule for design change.	Review and negotiate the reasonable price due to a recommendable price, according to design change	Method of cost analysis by using price and cost breakdown table. Wage rate Standard price of material Escalation clauses with indices	<ul style="list-style-type: none"> Related matter to be discussed Standard of VA contract(draft) 1st year to pay vendor 50% of money saved by VA. after subtracting the money to proceed VA. activity. 2nd year; Pay 40% 3rd year; " " 30% 4th year; " " 20% 5th year; " " 10% (Note: This clause is not necessary when investigation cost for improving is allocated and contracted to be paid)	

Fig. 5.1-2 Position of reasonable price and categorization by name



Note 1. \rightarrow Means one way, \leftrightarrow means possibility of mutual adjustment.

Note2. Policy of purchasing price consists of the following elements:

1. Sort of price

- (1) From the viewpoint of cost price : Consistency, expenses, accounting, special price, actual expenses and estimate price
- (2) From the viewpoint of contract : Compromise, agreement, negotiation, contract, large demand, rough estimate, reasonable, fixed, custom, precedence, billing, proposal, JASDF, development, reviewed and correct price
- (3) From the viewpoint of free market : Freedom, market, fixed price, precedence, contract, acquired matter, domestic, international, uniformity, competition, supply, price of demand, whole sale price, official quotation, open price
- (4) From the standpoint of control : Control, official rate, distinction, uniformity, accounting, compensation for expenses set up by Defence Agency
- (5) From the standpoint of monopoly : Monopoly, exclusive, one-sided, agreed price based on supply and demand
- (6) From the standpoint of domestic industry protection ; Official rate, control, negotiation, contract, encouragement, compensation of cost price, distinction, duplication, precedence, existing price
- (7) From the standpoint of calculating skill ; Rough estimate, schedule, budget, precedence, cost accounting, solidity, bareness, rate of diminution, standard cost & basic price

2 . Example of background rule to be mainly picked up

- (1) The rule of maintaining degree of operation
- (2) The rule of adequacy
- (3) The rule of proper timing
- (4) The rule of sharing burden of proportional expenses.
- (5) The rule of traditional system
- (6) The rule of techniques
- (7) The rule of solvency
- (8) The rule of substitution
- (9) The rule of maintaining position in the market

3 . The rule of maintaining position in market of purchasing price

- (1) A type of active price ; There are price plotting & initiative types
- (2) A type of passive price

Fig. 5.1-3 UNIFORM COMMERCIAL CODE § 2-206

Basic concept to form a contract by relationship of offer and acceptance
in UNIFORM COMMERCIAL CODE Chapter 2-206

UNIFORM COMMERCIAL CODE

§ 2-206. Offer and Acceptance in Formation of Contract

- (1) Unless otherwise unambiguously indicated by the language or circumstances
 - (a) an offer to make a contract shall be construed as inviting acceptance in any manner and by any medium reasonable in the circumstances;
 - (b) an order or other offer to buy goods for prompt or current shipment shall be construed as inviting acceptance either by a prompt promise to ship or by the prompt or current shipment of conforming or non-conforming goods, but such a shipment of non-conforming goods does not constitute an acceptance if the seller reasonably notifies the buyer that the shipment is offered only as an accommodation to the buyer.
- (2) Where the beginning of a requested performance is a reasonable mode of acceptance an offeror who is not notified of acceptance within a reasonable time may treat the offer as having lapsed before acceptance.

Fig. 5.1-4 Conditions format of estimate for product to be developed (Format A)

Division

To: _____ Date of issue _____ Person in charge _____

Date of answer _____ Person in charge _____

Date of decision _____ Person in charge _____

Conditions Estimate (Form A)

The purpose of these estimate conditions is to clarify and agree before product estimation.
 However adjustments can be made if circumstances and time are changed.

Part No.	Nomenclature	Qty / Aircraft	Year					
			No. of aircrafts					
			Delivery					

No.	Item	Our proposal	Your proposal	Agreed	Note
1	Delivery price				This column item can be skipped before going to the next step.
2	Specification	Drawing Engineering Spec.			Vendor must write the conditions to agree to our requested price as necessary
3	Manufacturing hourly rate				
4	Category of man-hour rate (in house, sub-con)				
5	Lot size				
6	Material cost	Actual result or estimated			Clarify whether result or estimate.
7	Jig cost	Show plan of number of tools			Show a price/cost structure table for high cost tools and jigs.
8	Development cost	Cost must be developed to phase plan			Use price/cost table.
9	Yield rate				
1 0	G.C.I.P				
1 1	Price contingency negotiating conditions				
1 2	The risk until first delivery	Your company owes cost of development			If you do not need to owe the risk cost, how much does the price changes?
1 3	Escalation formula				
1 4	Learning curve %				

Fig. 5.1-5 Conditions format of estimate for reviewing the product price (Format B)

To _____ Division _____
 Date of issue _____ Person in charge _____
 Estimate conditions (Format B) _____ Date of answer _____ Person in charge _____
 Date of agreement _____ Person in charge _____

Part No.	Nomenclature	Quantity / Aircraft	Note

No.	Item		Our proposal	Your proposal	Agreed	Note
1	Learning %	Set				
		Run				
2	SET TIME Standard time					
3	RUN TIME Standard time					
4	Manhour rate					
5	Yield rate					
6	Amotizing expenses					
7	G.C.I.P					
8	Conditions for making the price/cost structure table	A	Item	Each part } Each process }		
		B	Manhour rate			
		C	Std. Time Basis			
		D	Lot size			
		E	Number of aircrafts for allocated expenses			
		F	Others			
9	Material to explain the jig cost					
10	Material to explain the development cost					
11	Others					