

# Chapter 7

## Design to Cost (DTC) for Unit Production Cost

### Abstract

1. DTC for unit production cost is highly effective because it brings an advantageous result for the number of units produced from the beginning of the production.

Hence, DTC for unit production is the mainstream of DTC. By implementing DTC, it becomes possible for the development of products to obtain balanced performance, reliability, and maintenance.

2. There is a trend recently to use this method comprehensively as a tool to implement ISO 9000 and ISO14000.

## **Chapter 7**

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## **7.1 General Matters**

### **7.1.1 Introduction**

#### **7.1.2 Outline: DTC Steplist and Each Step for Unit Production Cost**

### **7.1.1 Introduction**

The objective and definition of DTC are as follows:

#### **(1) Objective**

As mentioned in the introductory remarks of Chapter 1, "the supreme goal of enterprise without impasse," as Dr. Peter F. Drucker says, is to create customers. Thus, the manufacture of products and systems with functions becomes the means for corporations to create customers. The DTC method was brought to life for this purpose. Its objective is to set the target cost and develop the design of a product of the highest value within that cost. This way, the satisfaction of consumers will be gained, and new customers will be brought in.

#### **(2) Definition**

Keeping this objective in mind, a block diagram reflecting the goal and means of a company's DTC for unit production cost is shown in Figure 7.1.1. In this procedure, the DTC method can be defined in the following way: Allocate the target cost for unit production by WBS (Work Breakdown Structure). Using a comparison of information of differences, proceed with product design step by step. Consider this to be a method of management by objective.

**Note:** A more important objective than the target unit production cost is the minimization of lifecycle cost. Strict estimate management of lifecycle cost requires an understanding of customers' expectations, the control of complex prerequisites and prior research data. However, the data cannot be expected to be accurate. Minimization of lifecycle cost will not be used extensively within the explanation of this procedure, except in the case described below. You may judge which design plan is more advantageous using information of differences.

Within the limits of the DTC method for unit production cost, a part of product design may be

improved. By doing so, the life span of parts may be stabilized. Also with a little additional cost, a major cost savings for lifecycle cost may become possible. Such a design plan may be found by the information of differences for lifecycle cost. Only when the comparison of ideas is obvious should the design of lifecycle cost be applied by using information of differences.

### **7.1.2 Outline: DTC Steplist and Each Step for Unit Production Cost**

The concept of DTC steps is described in Figure 7.1.2. An example of its content using the steplist is shown in Table 7.1.1. (Here, the DTC plan for a commercial aircraft is used as an example. An example of a military aircraft for the Defense Agency is described in Table 7.1.2) (Notes 1 & 2)

(Note 1) From here on, a DTC steplist for a commercial aircraft will become the model. An explanation of the outline for each step sorted into a steplist will be provided first. Detailed explanations of each step will follow. (Designs of Design to Cost not only include designs for drawings, but also designs for production and site management.)

(Note 2) When applying this steplist to other projects, change the wording and items as the need arises.

An explanation of Table 7.1.1 follows.

#### **7.1.2.a Preparation of DTC (DTC Phase I)**

In order to carry out the following DTC jobs systematically, the DTC implementation plan document must be prepared in this stage. A wide-ranging investigation to proceed with DTC and a minimum of two plans created from this investigation become necessary. The two plans must be realizable and comparable as kernels of conceptual or structural plans for the product. The overall result should be put together in rough form according to the WBS for the design area. Moreover, a draft of the target cost, which is the objective of the DTC, will also be decided in this phase. Figure 7.1-3 shows an example of the WBS for a design area. Figure 7.1-4 shows an example of the WBS for

the design area applied to a military aircraft.

#### 7.1.2.b Allocation of DTC Target Cost (DTC Phase II)

DTC Phase II is divided into the following two steps. In the first step, a realizable overall target cost should be set using the conceptual or structural plan drawn up in DTC Phase I: the target cost draft decided in the previous phase and the estimated cost by WBS from this phase must be compared. Even when the cost estimate is for a conceptual or structural plan which has no precedent, past knowledge is utilized. Break down and analyze the target matter to a level where prospects are available. By re-structuring the estimate, a rough estimate can be calculated which can be used. (Even for a completely new plan estimate, the break-down into known elements is always possible. The result of this break-down should be combined and re-estimated again. If you cannot break down to this level, it means that the development is not yet within your sight.)

The second step will utilize the results obtained in the first step. Subdivide the target cost using a WBS on the Baseline plan obtained after comparison. Then, work on the allocation.

#### 7.1.2.c Basic Design Work Using DTC Worksheet (Preparation of Plan Drawing) (DTC Phase III)

In this phase, comparative design plans and plan drawings will be prepared. Comparative design plans will be created through a LCC (Lifecycle Cost)/DTC Trade Worksheet as seen in Figures 7.2-8 and 7.2-9. Plan drawings for manufacturing drawings, to be prepared in Phase IV, will be drawn using baseline work based on the results of the comparative studies.

When the system to be examined is large, the process of plan drawings may be divided into two phases if necessary: basic plan drawings described above as plan drawings, and detailed plan drawings matching the equipment vendor selection phase. (Table 7.1-2 shows the case for a military aircraft. Phased management needs to be subdivided so that you can see the plan drawings divided into basic and detailed plan drawings.)

#### 7.1.2.d Detailed Design Work Considering Cost-Driving Factors (Preparation of Manufacturing Drawings) (DTC Phase IV)



























































































