CONCURRENT COSTING

This document was presented at the 1992 International Conference of the Society of American Value Engineers (SAVE) at Phoenix, Arizona by Theodore C. Fowler, Dayton, Ohio. It was published in the SAVE Annual Proceedings and is copyrighted (SAVE, 1992). Permission to upload this document to CompuServe has been given by SAVE.

Theodore C. Fowler, CVS, FSAVE, is the Managing Principal of Fowler & Whitestone, an international consulting company. Ted's introduction to the value disciplines came in 1954 under Lawrence D. Miles at the General Electric Company.

He is the author of the definitive book on Customer-Driven Value Analysis: *Value Analysis in Design*,Van Nostrand Reinhold, 1990. Ted is a member of the Southwestern Ohio Chapter of SAVE.

ABSTRACT

The Concurrent Costing program described herein provides the Project Engineer with a powerful weapon which commonly results in a dramatically more efficient design. The preparation of a detailed set of drawings and cost is also an essential step in performing upstream or concept-stage value analysis, (VA) sometimes referred to as "Value Engineering (VE)".

———————

The Problem

New designs often cost more than they should.

The best proof of this is that any detailed review of a new product invariably reveals massive opportunities for cost reduction.

The Reason

A new design concept is very delicate. The creators of such a concept will protect it in several ways:

They will not reveal the details of the design until they have "worked out all of the bugs."

This is often explained by the Project Engineer of a new concept in terms of the nearly infinite number of "branches" which he expects in the design process during the one or two year development and design process. While the Project Engineer and his/her engineers and designers have a basic plan for the design concept, they expect that bread-boards and engineering models must be constructed and tested, and that the final product might be very different from their present concept.

They will initially resist firm cost estimates, since they have no firm design upon which to base them.

This often manifests itself in statements that "cost doesn't matter at this stage. First it's gotta work. If I can't prove it's technically feasible, they will never give me a chance to develop it."

This set of conditions applies universally, and has existed, we can logically assume, since at least the days of Hiram Abiff and the temple-builders. They are the natural result of a self-protective human nature formed by the process of evolution.

If the above proves that new designs cost more than they should because of Human Nature, doesn't that mean that we can do nothing about it?

No! Experiences in the upstream VA of many new design concepts has proven that a technique called Concurrent Costing is not only highly effective in minimizing new product cost, but it is of great and direct benefit to the Project Engineer and his/her engineers and designers.

A brief comment on the use of the Concurrent Costing system in upstream VA: Value practitioners are often required to value analyze a new concept for which detailed cost is not available. All too often, they choose to short cut the micro-cost-allocation which is the source of most VA breakthroughs. They elect to allocate macro-cost-elements to their FAST Diagrams, a process which was described by one manager as being "as stimulating as kissing your sister." The value practitioner who truly understands the dynamics of the process will insist that management authorize the two man-weeks or more required to prepare and maintain a Concurrent Costing file. The payoff will benefit the VA effort, the Project Engineer, and the efficiency of the product-under-study.

The process is described below. It was developed by me and has been applied recently in several major successes.

Basic Assumption

Within the collective minds and the desk drawers of the Project Engineer and his/her engineers and designers are all of the details required to create a complete set of detailed drawings of the new concept as it presently exists.

For several reasons, this complete drawing set is not created at the design concept stage. Indeed, it is not completed until "design release", often one or two years downstream.

Process

Assign the Project Engineer to the ad hoc task of creating a complete set of detailed drawings of the design by assessing his or her data as well as file data and vendor drawings. Note that this responsibility cannot be delegated. At this point in product development, it is uncommon for anyone except the Project Engineer to possess the knowledge and insight required.

Commonly, several key members of the design team are assigned full-time to assist the Project Engineer.

Drawings may be file prints, marked up bluelines, quadrille pad sketches or modified CAD drawings. Drafting room protocol does not constrain the effort. The objective is simply to capture the essence of the part or assembly. Each drawing is given a distinctive sketch number. An engineering parts list is created to describe the hierarchical structure of the sketches.

The set of sketches is delivered to an ad hoc costing team, comprising at least one manufacturing engineer, one industrial engineer, and one buyer. Their task is to create an Indented Costed Bill of Materials and Labor, down to the level of individual labor operations. The persons assigned to this task must clearly be broadly experienced experts. This also is not a job to be delegated.

Ideally, the costing effort is carried out concurrently with the creation of the sketch package. The manufacturing engineer and industrial engineer will note reference data on the face of the sketch (machine type, labor classification, assumptions). The buyer will also note data on sources and conditions on the face of the sketches of purchased items.

The estimated Costed Bill of Materials and Labor resulting from this effort will not be precisely accurate. It is sufficient at this early stage of design activity to reach an accuracy of ±10%, or even 20%. It is, however, critical that the level of detail of the Costed Bill describe each micro-element of the design, down to each element of raw material and each individual labor operation. Purchased items must be sketched with sufficient detail that the costing team can break it out into the maximum practicable level of material and labor detail.

The costing is updated periodically throughout the design cycle by the same costing team, providing a continual base reference for the design process. Each iteration enhances the accuracy of the figures. The ideal system uses an "off-stream" version of computer-based costing. Benefit to the Project Engineer?

Without exception, the Project Engineer and his or her engineers will initially resist a system which appears to require

them to "freeze" their design before they think it is ready. It is also without exception, however, that Project Engineers look back upon the process as extremely beneficial to their effectiveness in the development process. As a Project Engineer expressed it recently, "Knowing the cost of my designs as I was developing them put me in a whole new dimension."

You see, they did not really mean that "cost doesn't matter at this stage . . ." as quoted on page one. Their real concern was that an outsider would unduly lock up the options. When they experience the personal benefits of upstream cost visibility, they become rabid supporters of the process.

The obvious broader benefit of the Concurrent Costing system to a Target-Cost-based development system is the creation of a non-moving-target for tracking the actual progress of the design process, unperturbed by those "automatic" and uncontrollable random variations of design and cost.

Resources Required

A simple new product concept can be reduced to sketches and cost in two days. A complex new product concept could require 4 weeks and 800 man-days. It also takes the Project Engineer and key engineering, manufacturing, and purchasing personnel off-line for up to a month. Is any benefit worth this significant investment?

No formal studies have been performed which quantitatively evaluate the benefits of Concurrent Costing, but Project Engineers who have used the system have estimated a downstream saving of 6 to 12 months through the elimination of blind alleys and redesign effort. It has proven to be an effective system for "doing it right the first time."