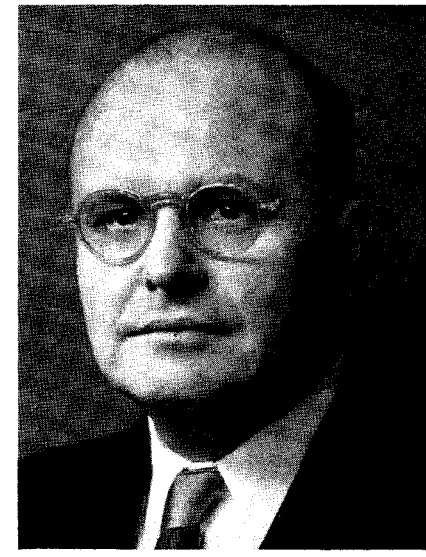
Product Change Improves Manufacturability



By L. D. MILES
Manager
Value Analysis Unit
Materials and Purchasing Department
General Electric Company
Schenectady, New York

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THE concept of value, like the concept of sin, varies.

If a coat is produced for $15, but by ingenious manufacturing processes can be made for $10, is its value reduced? If a razor is purchased for $1 and the purchasing agent negotiates the purchase for 75¢, is its value lowered? If the hinge for the door of your car costs $2 and, by inspired creative design, one which accomplishes the same function is created for 50¢, is the value lowered? Perhaps, but probably not.

What is Value?—Value, surprisingly, is usually not determined by an intensive study but by an extensive one. Value is determined by comparison.

The value of the toaster used in making the morning's toast is not determined by its cost elements but rather by comparison with other means of making toast. The value may be the same if it can be made as conveniently and as well and as interestingly another way. Value is the lowest cost at which a function by any means, can be accomplished effectively and reliably.

Value Analysiss—Value analysis is a scientific and sensible evaluation of whatever costs money. It covers parts, assemblies, services, processes, and ideas. Under no circumstances does it ever involve any quality deterioration. It applies to all quantities from one to millions, to any product of any size. Value analysis pushes out far and fast into wide searches and broad comparisons.

We are accustomed to analyzing performance, analyzing weight, analyzing quality. Today, we will analyze value.

To analyze weight—we study what makes weight.

To analyze value—we study what makes up value.

How is Value analyzed? Here is how it goes. Let's examine the cover of a control device with these simple questions.

1. What is it?
2. What does it cost per year?
3. What does it do?
4. What else would do the job.
5. What would that cost?

1. It is a small molded plastic part. 2. It costs $40,000 a year for a million of them. 3. Although the control device itself is in a semi-enclosed compartment it further keeps accidental contaminates out of the control. 4. Extensive study shows that a flat piece of laminated textolite would probably provide the same function. 5. $15,000 for a year's supply.

And so it goes:

First, gathering facts
Second, facing up to functions
Third, recognizing costs
Fourth, searching effectively for alternates
Lastly, comparing.

There's more to analyzing value than meets the eye. It sounds simple—but it isn't—because human attitudes are involved. Decisions are based, not upon facts, but upon the partial information—fact and falsity—which people have, and the attitude they have toward this information.

Popular Conceptions Are Usually Wrong

Popular conceptions never necessarily fit specific cases; often they are no longer even true as generalities.

"Plastics are brittle": —so is cast iron brittle—but steel made from iron is not brittle. So, plastics made for the job are not brittle. Polyethylene toys are not brittle. We have a radio cabinet that is so rubbery that nails are driven into it without fracture.

"Plastics are weak":—So is rubber weak, but in tires you will get 30,000 miles of wear, and from the wide spectrum of plastics are materials such as this glass-reinforced polyester which is substantially non-breakable.

"If it is a thin enclosure, sheet steel is most economical":—still this die cast part 1/32-in. thick provides the same performance at lower cost in automobiles.

"Tool costs are too high for our quantities":—yet plastic dies are now made for a fraction of former die costs and low-cost tooling specialists do startling things. This welding segment was cut out individually in quantities of a few thousand a year because "dies would cost too much." Still, a low-quantity stamping company, when actually given an opportunity to bid on it, quoted $75 for dies and the cost each drops from $1.41 to 39¢.

"If it is solid material, it is better": —still, instead of this solid machined nut, the use of an available "Pal Nut" provides better function, stands more severe vibration, and the cost, instead of 8¢ is 0.8¢.

"An upsetter can't gather enough

material to make a spacer this large": —still this is accomplished by an upsetter using a double collar and the cost goes down from $1.85 to 50¢, while the next example is accomplished by two pieces, a simple upset roll threaded part and a spacer, and the cost drops from 5¢ to 1¢, the same function for 1/10 to 1/5 of the cost.

"They can't roll an Acme thread":—still it happened that in the same city where this statement was made, a company has equipment that is rolling Acme threads.

"We are already using the best processes":—then suddenly we find that, instead of a drop forged ball stud, a hot upset stud accomplishes the identical purpose at 25% reduction.

"We are doing it about right": —still we find a square washer costing 32¢ which can as well be had for 8¢ from a washer supplier. The screw machine control shaft costing 7½¢ when as a miniature zinc die casting, a better part, costing 1½¢. The machine brass nut which receives it, costing 3¢ when the molded nylon nut costing 1¢ does a better job. A remote tuner coil adjustment costing 3¢ when identical performance can be provided by a header and roll threader with an automatically formed loop on the end at 1¢.

"We can't do any of our jobs for half the cost":—still after decades of refrigeration and millions of refrigerators, a condenser was provided for refrigerator-type equipment which does a more efficient job than the former tube and plate and costs approximately half.

"We are up to date on what is new": —still aluminum is not used because of the "problems of copper to aluminum joints" when a specialty product can be purchased which already contains the properly made copper-aluminum tubing joint. Furthermore, stainless steel is being purchased for applications which can be as well or better performed by chrome diffusing, and designs which should benefit from the "dirty plate" process of roll bonding, do not use it because it is unknown to the designers and the methods men.

Attitudes Must Be Changed

The first job, then, is to improve attitudes of the embryo analyst. This is accomplished slowly by use of overwhelming new information coupled with actual experience that differs from the past. As attitude improvement starts, then the same technical skills which have traditionally been used for securing higher efficiencies and making new products are devoted to getting the "same performance for very much lower cost."

More Information Plus Better Attitudes

More information provided at the point of decision plus the attitude to use this information promptly in decision-making, brings vastly improved value.

Some of the Building Blocks of Better Value

Better Purchasing: — In one operation, only one product used a capacitor. The purchasing agent said, "I know we have the best supplier and the best deal for this capacitor. I have done it myself." By calling the purchasing agent at an operation using hundreds of different capacitors and the stating the problem to him, the telephone call paid off with the same capacitor but changed terminals with an $8500 per year saving.

Better Materials:—A new item such

as filament tape brought packaging possibilities—eliminating $40 from the packaging cost of every hundred washing machines. Plastic coated steels can be drawn and require no later finishing, providing very attractive salable items and necessitating no spray boot equipment.

"Better Use of Specialty Products: —Standard cans and boxes can be bought from a catalog instead of making enclosures.

Although we are frequently told that there are no standard springs (each must be designed), there are companies with catalogs of standard springs which can be bought for pennies or dimes even in low quantities.

Laminated shims which can be peeled like onions so that, instead of the costly machining, the right thickness is secured in instants sometimes saving as much as $10 a machine.

Different forms of raw materials such as round discs of aluminum used normally as blanks in impact extrusion presses useful for structural parts—in one case the disc was flattened and drilled at a total cost of 13¢ in lieu of a former cost of $1.27 for the part made from sheets.

Rolled spacers for use where the side is relatively unimportant and the end spacing is important. In one case for a cost of 3¢ instead of 29¢ each accomplished the same function.

Terminals, functional and structural parts of wide variety can be fabricated by specialists from tubing and perform large function for moderate cost.

Better Use of Available Facilities:— Specialists with special purpose equipment for fabricating copper tubing provide small tubular parts for a fraction of their cost from general purpose machines; for example, one part which was costing, with material, labor, and overhead, 14¢, could be had in its finished form, delivered to the plant, for 1¢.

A small bracket with tapped holes costing $13/M could be had from a specialist who makes small stampings with tapped holes automatically in a labor-free process at a delivered cost of $3/M.

Functional parts made from sheet materials and strip materials can be made instead from wire and wire formed parts through the skills of specialty suppliers whose engineers are very ingenious in using this engineering material.

Better Processes: — Instead of machining items such as a pulley at a cost of 60¢ frmo steel bar, it is die cast for 13¢.

Instead of die casting a cover for $1.02, it is made as a steel stamping for 60¢.

Instead of machining this aluminum spacer from sheet for $1.85, it is cast for 50¢.

Instead of a second operation stamping holes to fasten a perforated drier part to the support, perforate it continuously using the same holes at a saving of 25%.

Instead of buying bolts and washers, allow the manufacturer to ship the untrimmed bolt heads which have the flash constituting a washer at no added cost.

Although it sounds most economical to make small terminals from flat copper on a multi-slide machine, the facts show that terminals can often be provided more economically and of equal strength with less copper from copper tubing by equipment specializing in that field.

Although it was felt that the ultimate was secured in nesting silicon steel on a ballast transformer, even though 42% was lost at nesting, an intense study brought new thinking which reduced the loss to 25% making phenomenal savings in the cost of material.

Instead of buying steel rod in two sizes from which a shaft and hub were machined and later assembled with an interference fit, make the rod part only, use it as an insert, and cast on the hub, arriving at an equivalent product at half the total cost.

Newer Processes: — Instead of buying a hinge from a hardware manufacturer, have it made by a continuous roll form method saving 25% of its cost.

Instead of riveting or eyeletting to fasten relatively thin metals together, use metal stitching without pre-punched holes to literally sew the material together.

Instead of the traditional spot welding, use the new cold welding equipment and process to fasten the parts with numerous advantages.

Instead of having bulky equipment for heating parts, use an Ohms machine which conductively heats steel exactly where it is needed to the right temperature in a period of seconds.

Instead of buying rubber gaskets, squirt in a self-vulcanizing material which sets up in minutes such as one application which was costing us 11¢ and by this method was reduced to 1¢.

Better Human Relations: — On the whole, the people with whom we deal are average people the same as we are doing some things right and some wrong, constantly making mistakes and constantly concerned about protecting themselves from the consequences of what people will think if they know about these mistakes. We can build a framework of human relations in which each man knows that we all know that he is making mistakes and we are making mistakes, so that time and money do not, to such an extent, have to be wasted.

Tests for Value: — Ten Tests for Value, which serve to point the way, have been evolved and have assisted in eliminating large amounts of unnecessary cost. Here they are:

1. Does its use contribute value?
2. Is its cost proportionate to its usefulness?
3. Does it need all of its features?
4. Is there anything better for the intended use?
5. Can a usable part be made by a lower cost method?
6. Can a standard product be found which will be usable?
7. Is it made on proper tooling—considering quantities used?
8. Do material, reasonable labor, overhead and profit total its cost?
9. Will another dependable supplier provide it for less?
10. Is anyone buying it for less?

Conclusion

To conclude: — We recall that even a thousand years ago there was no general shortage of the goods to make up a high standard of living, as then known to them, but high cost denied these goods to most.

For 2000 years, the American Indians roamed the prairies of this—one of the richest lands in the world in mineral wealth and soil fertility, naked

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DELTA-STAR BUILDS NEW CONTROL SWITCH

Delta-Star Electric Division, H. K. Porter Company, Inc., recently began manufacturing a line of newly designed control switches called the Type M-2. These multi-stage switches, available for many uses, are rated 20 amperes continuous rating with 250 amperes short-time (3-second) rating. Only 3⅞ inches high by 3¼ inches wide, the compact design permits easy wiring and quick inspection. Large terminal clearances and complete baffling between sections assures high interrupting capacity—at 250 volts ac on inductive circuits, single break contacts are rated 25 amperes, double break contacts, 75 amperes.

Other divisions of H. K. Porter Company, Inc., are Alloy Metal Wire, Connors Steel, Henry Disston, Eseco, Laclede-Christy, Leschen Wire Rope, McLain Fire Brick, Quaker Rubber, Quaker Pioneer Rubber, Riverside Metal, Vulcan Crucible Steel, and W-S Fittings.

STAGG

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local characters had watched Ernest fishing. Finally Ernest asked him why he didn't try it. The old fellow answered, "I ain't got the patience."

● Bernard Gantt (T.C.I.), Harry Ross and Bill Grigsby (Industrial Mastics), and Bill Sparks (Chicago Bridge) spent several days fishing at Gulf Shores. Their luck was good, especially with the bluefish. Bernard caught so many of them the group immediately tagged him "Bluefish Gantt". They had some anxious moments one day when a squall suddenly caught them on the Gulf, but luckily were able to reach shore without mishap.

MILES

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savages because they didn't have the tools and they didn't know how to develop them.

There will be no prolonged shortage of goods in our country. The only sure method of reducing the standard of living is by high costs.

There is no object in learning to design and build automatic washing machines, dishwashers, or finer automobiles, if costs become so high that few can buy.

No one more intimately controls present and future costs than the tool engineers.

You have both the tools and the knowledge—we're counting on you to help control a bright future for us all.

STRICKLER

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time price and allocation controls within the United States, with the rubber and coffee schemes I have described, with our efforts to stabilize domestic agricultural incomes, and with the International Materials Conference, does not give us a basis to expect government controls to be superior to free markets.

No one can foretell the future. However, in my opinion, the free play of competitive forces set in motion by your day-by-day decisions over the long run will be more successful in insuring that the world's resources are put to their most productive use than the decisions of well-meaning bureaucrats. The truth of the matter is that none of us is smart enough to plan a regimented world economy.