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Volume 2 Selected Papers

Objectives of Financial Statements

AICPA

**American Institute of
Certified Public Accountants**

May 1974

A Test of the Feasibility of Preparing Replacement Cost Accounting Statements

Lawrence Revsine

This study represents a first step in a lengthy research process required to determine the feasibility of alternative measurement processes, such as replacement costing. The objective of this study was to discover what, if any, were the major difficulties which would be experienced in attempting to prepare replacement cost statements for an actual firm.

We must emphasize that this study does not address the issue of the materiality of differences between replacement costing and historical costing. Our sole objective was to test the feasibility of implementing replacement cost accounting in an actual business enterprise. Logically, implementation studies should precede detailed analysis of the characteristics of alternative information systems. The reason, of course, is that, if the alternative information cannot be provided, there is little point in studying its potential impact.

Since there are many variables which could conceivably influence the feasibility of replacement cost statements, the findings of a single implementation study cannot be regarded as conclusive. On the contrary, before defensible generalization is possible, implementation must be tested in a cross-section of industries having diverse operating characteristics. Only after this evidence is available will it be possible to assess the feasibility of replacement cost accounting. This study must thus be viewed as providing some sorely needed initial evidence in a lengthy, iterative research process.

The following sections contain a discussion of the major issues which arose during the implementation effort.

Inventory Feasibility

It should be emphasized at the outset that the inventory accounting system described in this paper has been developed for internal management use at the test company. Under certain circumstances, this system could generate data which differ from generally accepted accounting results. Accordingly, for external reporting purposes, management compares the inventory numbers generated by the internal system with those which would result under identical conditions using generally accepted accounting principles. If this comparison

discloses no material differences, then the internally generated inventory numbers are also used for external reporting purposes. However, if material differences do exist, then company figures are adjusted for external reporting purposes to conform with results which would be generated from the application of generally accepted accounting principles.

For purposes of inventory accounting, the primary objective of replacement costing is to differentiate between normal operating profits and holding gains. The test company was already using an internal inventory system which was closely related to—and entirely compatible with—replacement cost accounting. That is, the standard costs which were used to value opening and closing inventories were based upon the then current replacement cost of the inventory input. Cost of goods sold for internal management reporting purposes was also measured by reference to the most recent quarterly revision of the replacement cost standards. In analysis form, the test company's inventory accounts for internal management reporting purposes would contain the following inflows and outflows. (For ease of exposition, manufacturing overhead is temporarily ignored.)

Beginning inventory: This would represent the then current replacement cost for all inventories, i.e., raw materials, work-in-process, and finished goods.

Add: Purchase of raw materials at actual purchase prices and labor used in production at actual labor rates.

Subtract: Cost of goods sold, based upon replacement cost standards in effect at the time of sale.

Equals: Ending inventory per books.

The ending inventory per books as computed above will not satisfy the company's internal accounting objective; that is, book inventory will not equal the current replacement cost of the ending inventory. Aside from inventory shrinkage and usage variances, which we temporarily ignore, the reason for this difference is that the prices in effect at the end of the period will not necessarily correspond to those which were used to price beginning inventory, or to those which were in effect during the period as reflected in purchases. In other words, the ending inventory per books as computed above will not equal the ending inventory valued at end-of-period replacement cost because of price changes which arose during the period. Accordingly, an adjusting entry is necessary in order to reflect ending inventory at current replacement cost. It can be demonstrated that the amount needed to adjust the ending inventory per books to the current replacement cost of the units in ending inventory (disregarding shrinkage and variances) is precisely equal to the holding gain or loss during the period. That is, the existing system is entirely

Company personnel stated that the prime motivation for using this inventory system was to provide a better pricing basis. Furthermore, budget projections were thought to be improved since costs are reflected at levels more likely to prevail in future periods.

compatible with replacement cost accounting requirements. However, for external reporting purposes, the company does not treat this inventory adjustment as a holding gain or loss. Rather, it is credited or charged against cost of goods sold. After this is done, the externally reported results are essentially similar² to those of Fifo historical costs.

We will now demonstrate the equivalence between holding gains and the amount of the inventory adjustment. Also, the operation of the test company's inventory accounting system will be illustrated with a highly simplified example.

For ease of exposition, assume that the test company sells only one product and that this product requires no conversion costs to make it saleable. Also assume that purchases and sales take place on the same dates. The company's assumed inventory experience over the year is as follows:

Beginning inventory, 100 units @ \$1 each (replacement cost at start of current period)

<i>Purchases</i>	(assumed to be at the same date)	<i>Sales</i>
50 units @ \$1.10 each		30 units
50 units @ \$1.26 each		30 units
50 units @ \$1.30 each		30 units
<u>150 units</u>		<u>90 units</u>

Ending inventory, 160 units (100 + 150 - 90) @ \$1.30 each (replacement cost at end of current period)

Since the unit price of the inventory rose throughout the period, the company has obviously experienced holding gains on inventory. The exact amount of the holding gains can be computed as follows:

<i>Holding Gains</i>	<i>Total</i>
On price increase from \$1 to \$1.10 per unit: 100 units (beginning inventory) @ \$.10 each	= \$10.00
On price increase from \$1.10 to \$1.26 per unit: 120 units (100 + 50 - 30) @ \$.16 each	= \$19.20
On price increase from \$1.26 to \$1.30 per unit: 140 units (100 + 50 - 30 + 50 - 30) @ \$.04 each	= \$ 5.60
Total Holding Gains	= <u>\$34.80³</u>

² The correspondence would be precise only if there were no unrealized holding gains during the period. Notice that unrealized holding gains can arise in at least two different ways: (1) if inventory levels increase over the period, or (2) if prices at year-end are higher than those which prevailed at the time of the last inventory purchase.

³ Edgar O. Edwards and Philip W. Bell (*The Theory and Measurement of Business Income*, University of California Press, 1961, p. 146) suggest two equivalent short-cut procedures for computing holding gains. In their first method, they assume that "the initial inventory is held over the entire period while its current cost changes from that prevailing at the beginning to that prevailing at the end . . ." and that "any excess of final inventory over initial inventory was acquired at the average purchase price and held to the end of the period." [Fn. 3 continued on page 232]

Given this simplified data, we will now illustrate the method that the test company uses in its inventory accounting. Recall that the test company's internal system carries opening inventory at its then current replacement cost. Purchases are charged to inventory at actual cost and cost of goods sold is determined by reference to the replacement cost at the time of sale.

Using our illustrative data:

<i>Beginning inventory</i> (100 units @ \$1.00 each)	\$100.00
<i>Purchases</i>	
50 units @ \$1.10 each = \$55	
50 units @ \$1.26 each = \$63	
50 units @ \$1.30 each = \$65	<u>183.00</u>
<i>Goods Available for Sale</i>	<u>\$283.00</u>
<i>Cost of goods sold</i> (at replacement cost at time of sale):	
30 units @ \$1.10 each = \$33.00	
30 units @ \$1.26 each = \$37.80	
30 units @ \$1.30 each = \$39.00	<u>\$109.80</u>
<i>Ending inventory per books</i>	<u><u>\$173.20</u></u>

Because of price changes, this ending book inventory figure of \$173.20 does not equal the ending market value of the inventory. In order to determine the market value of ending inventory, the units reflected by the physical

[³ Cont.]

Using this method to compute holding gains, the average purchase price must be determined. For our example, this is

50 @ \$1.10 each = \$ 55
50 @ \$1.26 each = \$ 63
50 @ \$1.30 each = \$ 65

$$\frac{\$183}{150} = \$1.22 \text{ average purchase price.}$$

The computation of the gain is thus:

Initial inventory	100	(\$1.30 — 1.00) =	\$30.00
Excess	60	(\$1.30 — 1.22) =	<u>4.80</u>
Total holding gain			<u><u>\$34.80</u></u>

In their second short-cut procedure, Edwards and Bell assume that "the initial inventory is held while its value changes from its current cost at the beginning of the period to the average purchase price, and . . . the final inventory is acquired at the average purchase price and held while its value rises to current cost at the end of the period" (p. 146).

Following this method, the computation is

Initial inventory	100	(\$1.22 — 1.00) =	\$22.00
Final inventory	160	(\$1.30 — 1.22) =	<u>12.80</u>
			<u><u>\$34.80</u></u>

The Edwards and Bell approach gives the same answer as the direct computation only under two circumstances (which are both met in our illustration):

". . . [1] sales and purchases (not of the same goods) take place on the same dates (or continuously), and [2] the ratio of the quantity sold to the quantity purchased on each date is equal to the ratio of the total quantity sold to the total quantity purchased during the period." (Edwards and Bell, p. 144n.)

inventory must be valued at the end-of-period replacement cost per unit. Assuming no inventory shrinkage, the replacement cost of the physical inventory on hand at the end of the period is \$208.00 (160 units @ \$1.30 each). The company would then make the following entry to bring the ending inventory per books into agreement with the ending physical inventory at current replacement cost:

DR Inventory	\$34.80	
CR Inventory increase		\$34.80
(Amount required to bring book inventory of \$173.20 up to its current replacement cost of \$208.00. The test company eventually closes the credit balance to cost of goods sold.)		

It is important to notice that the dollar amount of this adjustment is precisely equal to the already computed amount of holding gains during the period (\$34.80).

While this is a somewhat simplified version of the test company's actual system (i.e., overhead is ignored in the example), the essential characteristics of the accounting method are evident. Of primary importance is the fact that the test company is effectively using a replacement cost system for its internal inventory accounting. Ending inventory is valued for internal management purposes at current replacement cost on the balance sheet; cost of goods sold is measured as the replacement cost of each sale at the time it is made; and holding gains or losses can easily be segregated in the book-to-physical inventory adjustment. For external reporting purposes, any significant differences between historical and replacement cost would be adjusted so that the externally reported financial statements conform to generally accepted accounting principles.

Implementing Replacement Cost For Inventories

It is clear that the basic characteristics of the system just outlined are sufficient for the development of replacement cost inventory accounts. However, our discussion was simplified and did not incorporate certain technicalities that existed at the test company. We will now explore the impact of these complications.

Overhead. Management felt that there were only minor changes in the replacement cost of overhead items incurred during the year. In part, this is attributable to the fact that over 60 per cent of manufacturing overhead consists of wages and related payroll expenses. Since wage increments are granted only at the end of the fiscal year, this portion of manufacturing overhead expense does not change during the year. Of the remaining 40 per cent of overhead expense, the researcher adjusted only the depreciation figure to a replacement cost basis. This seemed to be a reasonable approach, given management's comments regarding the stability of other overhead items and the immateriality of the amounts involved. However, the replace-

ment cost of both beginning and ending inventories was adjusted to reflect the new *indirect* wage rates which would be in effect for the ensuing year. (The company had itself adjusted its ending standard replacement cost to reflect scheduled increases in *direct* wage rates.)

Holding Gains. In the simplified example described above, holding gains were precisely equal to the amount of the adjustment required to restate book ending inventory to a replacement cost basis. In the absence of complicating factors, one could implement a replacement cost system by simply treating the inventory increase (decrease) as a holding gain (loss).

In the test company, however, the amount of the inventory adjustment potentially incorporated other factors in addition to the holding gain or loss. For example, it will be remembered that direct labor was charged to the raw material/work-in-process account at actual and removed at standard. Since labor rates are fairly uniform and since they do not change over the year, there is no labor rate variance.⁴ However, labor usage variances could exist. To the extent that such variances do exist and do not cancel out over the year, the accumulated effect of the variance is reflected in the ending book inventory figure and would influence the amount of the adjustment required to bring the ending inventory into agreement with replacement cost. Thus, the reported holding gain or loss would not reflect the true holding gain or loss for the period.

In this case study, there were no means for determining the existence or amount of this variance. Accordingly, the reported holding gain on the replacement cost income statement could include the effect of a nonzero accumulated labor usage variance over the year. It would appear, however, that, if a replacement cost system were implemented in similar firms, this problem could be overcome in one of two ways. First, if the labor standards in effect were truly attainable, and if the process were closely monitored to assure its continued efficient operation, then one might expect the net variance to approach zero over the period. A second, and preferable, alternative would involve actual isolation of the labor usage variance. In the test company, it would be relatively easy to accumulate such variances since direct labor time-tickets by job are already prepared. Indeed, accounting personnel at the company stated that they are currently considering isolating this variance. In addition to aiding the implementation of replacement costing, this change would obviously improve management control over labor cost.

Another nonholding gain factor which was potentially reflected in the inventory adjustment is the effect of material usage variances and/or inventory shrinkage.⁵ Insofar as such events actually occurred, the reported holding gain is understated. Since holding gains and usage variance-

⁴ Material rate variances are also inconsequential for two reasons. First, the blanket contracts guarantee price stability for high volume inputs. Second, standards are adjusted quarterly to reflect current replacement prices.

⁵ As a practical matter, material usage variances were thought to be small in the test company since defective production could often be reworked.

shrinkage result from different causes, their individual effects ought to be separately reported. In the test company, however, this was not possible for the period studied.

Once again, it would be relatively easy to remedy this defect by generating information which would simultaneously strengthen the internal control process of the firm. Recall that the inventory accounting of the firm is already computerized. However, the computerized system deals with dollar values only; that is, unit information is not accumulated. However, discussions with data processing personnel suggested that it would be relatively easy to incorporate unit data into the existing system. At present, cost transfers between inventory accounts and between finished goods and cost of goods sold, are accomplished by accumulating—item by item—the cost of various materials input components. If this already existing accumulation were expanded to incorporate units of input in finished goods and goods sold, the combined usage variance and shrinkage could easily be isolated. To illustrate, this expanded system could record purchases in units as well as dollars and identify such units by part number. (This is already done for high dollar-value items.) Since engineering specifications already enumerate *all* raw materials components of modules and completed systems, subsequent transfers could relieve the appropriate materials account for both dollars and units when goods are sold. At year-end, the books would reflect the total units that should be on hand. An explosion of the physical inventory into its various input components would show the actual units on hand.⁶ A comparison between physical and book *units* would reflect missing and/or wasted materials for the period. Such shrinkage could be removed from the book inventory valuation figure using a separate adjusting entry.⁷ Then, the subsequent adjustment of this new book inventory figure to reflect replacement cost would incorporate only the effect of inventory holding gains.

It is important to recognize that the test company's method for computing replacement cost of goods sold approximates Edwards' and Bell's "ideal" method. Because of this, certain assumptions and approximations needed to compute holding gains and losses in other situations are avoided.

According to Edwards and Bell, the ideal method for computing replacement cost of goods sold requires determination of an item's current cost at the date of sale. Edwards and Bell apparently believe that this information will not be available under certain circumstances and therefore suggest an alternative computational technique. In their alternative computation, replacement cost of goods sold is measured only at the end of the year and is computed by applying the weighted average replacement cost to the units sold. Certain assumptions are necessary for this technique to yield the same answer as the "ideal" approach. These assumptions are that "sales and

⁶ This explosion is already prepared in order to value the ending inventory at current replacement cost.

⁷ Shrinkage and waste would be presumed to have occurred evenly over the period and thus would be valued at average replacement cost for the year.

purchases (not of the same goods) take place on the same dates (or continuously), and the ratio of the quantity sold to the quantity purchased on each date is equal to the ratio of the total quantity sold to the total quantity purchased during the period" (p. 144n). Furthermore, if cost of goods sold is computed using the approximation technique (rather than the "ideal" method), then these same assumptions must hold in order for Edwards' and Bell's holding gains computations (see footnote 3, pp. 231-32) to equal the true holding gains or losses for the period.

The assumptions required to validate Edwards' and Bell's alternative computation technique are not unreasonable and would seemingly be appropriate for all but the most highly seasonal patterns. But, in contrast to that approach, the test company's techniques are superior since they reduce the need for making any assumptions regarding the regularity of inventory inflows and outflows. Since the test company recomputes current replacement cost for all inputs and final products each quarter, its measure of cost of goods sold is, for all practical purposes, equal to the replacement cost of goods sold at the sales date.⁸ When this "ideal" method is used, the end-of-period adjustment of book inventory to current replacement cost will reflect the actual holding gains or losses irrespective of the pattern of inventory inflows and outflows. Thus, this method is of general applicability and would provide accurate cost of goods sold and holding gain information even for highly seasonal types of businesses. (Of course, these comments presuppose that the methods suggested above for isolating inventory shrinkage and labor usage variances are adopted.)

Implementing Replacement Cost For Long-Lived Assets

The test company's fixed asset records were kept on a historical cost basis and thus required adjustment. Three general categories of fixed assets existed—manufacturing equipment, building, and land. The replacement costs shown on the financial statements are net of the tax shield which is unavailable to the test company. That is, since the company did not purchase the assets at their current replacement prices, the company's future tax deductions will be less than those of other companies which did buy identical assets at current prices. Subtracting this tax shield thus makes interfirm statement comparisons more meaningful. Since land is generally not depreciated and thus provides no tax shield, the carrying value for land is equal to its unadjusted market value.

The adjustment procedures for each fixed asset category will be described separately.

⁸ This is especially true because of the company's blanket buying contracts for materials. Only a few blanket contracts expire each quarter. These changes are reflected in the new replacement costs. Most other material prices remain unchanged. Similarly, labor rates do not change during the year. For these reasons, a quarterly redetermination of replacement costs would seemingly provide a very good estimate of the current replacement cost of goods sold.

Manufacturing Equipment. The manufacturing equipment used by the company can be divided into two general categories. One category (which represents 62 per cent of the December 31, 1971 equipment employed at original historical cost) was general purpose electronic equipment. The other category represents self-constructed equipment, work benches, and special purpose items. Different adjustment procedures were used for each category.

The general purpose electronic test equipment consisted of items such as oscilloscopes, pulse generators, and wave analyzers. This equipment had a ready market with dealers in used electronic equipment. These dealers' price lists were used to generate the replacement cost balance sheet values (at both the beginning and end of the year) and to compute replacement cost depreciation for the year.

No problems were encountered in determining asset carrying values for the general purpose equipment. Price quotations were available for all items. The only assumption necessary was that the condition of the company's equipment approximated that of the reconditioned equipment being offered by dealers. Since reconditioned equipment sold for only 10 to 15 per cent more than unreconditioned equipment, the potential error is small.

Turning to the second category of manufacturing equipment, replacement costs for self-constructed equipment, work benches, and other special purpose items were not readily available. It is possible that replacement costs for some of these items could have been ascertained; however, given the time constraints facing the researcher, no protracted effort was made. As a consequence, index numbers were used to develop balance sheet replacement values and to compute replacement cost depreciation.

The price indexes used were taken from *Business Statistics*, the supplement to the *Survey of Current Business* (1971). Our objective was to choose the most specific index possible for each category of assets. Obviously, the more specific the index, the closer the correspondence between index movements and movements in the actual prices of the assets under scrutiny. The Electrical Machinery and Equipment Index was used for self-constructed and special purpose assets. The Metal and Metal Products Index was used for work benches and shelves.

Building and Land. The test company had recently received an offer for its building and land. Since this offer was rejected, management apparently believed that the use value of the property was higher than the offer price.

The offer for the land and building together totalled \$1,200,000. Of this amount, \$1,000,000 applied to the land and the remainder applied to the building, which the offeror intended to raze after a short period of use. While there is no reliable method short of direct appraisal for determining the replacement value of the land, this value is obviously in excess of the \$100,021 historical cost carrying value of the land. Accordingly, the offer price of \$1,000,000 was used to value the land. While this figure probably understates true replacement cost (since the offer was rejected), it does represent a reasonable estimate of current value.

Because replacement cost is intended to be a surrogate for use value, the \$200,000 offer price allocable to the building cannot be treated as a valid

representation of current replacement cost. That is, the building apparently had little use value to the offeror, who intended to demolish it. Accordingly, some other means for determining current replacement cost was required. Direct appraisal represented one possibility; index adjustment represented another. Index adjustment was selected because of time and cost considerations. The News Record Building Index was used to perform the calculations. Notice that this procedure generates a combined replacement cost for the land and building which exceeded the total offer price (\$2,073,512 versus \$1,200,000).

Comparison of Differences. Determining the amount of difference between conventional and replacement cost values is complicated by differences in the treatment of tax effects under each method. On a conventional basis, the expected cash flow effects of differences between tax basis and book values are segregated in a deferred income tax account. In contrast, the effect of differences between tax basis and carrying values are offset against the asset value itself in a replacement cost system. (The reason for this difference is that the tax effects are deemed to reduce the service potential values of the assets. In accordance with the theoretical rationale for replacement costing, these service potential effects are directly offset against the asset itself.) Thus, to measure the extent of valuation differences, the deferred income tax amount must be deducted from conventional book values and this net amount compared with replacement cost carrying values. Alternatively, the comparison may be made before any adjustment for tax effects. Exhibit 1, opposite, presents a summary of fixed asset values on each basis before tax adjustment effects are considered.

Depreciation. Replacement cost depreciation was computed using the same depreciation methods and useful lives employed by the test company for its external accounting statements. However, the depreciable basis for the replacement cost computation represented the average annual current replacement costs of the fixed assets in service rather than their original historical costs. On this basis, replacement cost equipment depreciation totaled \$30,428, as compared to historical cost depreciation of \$35,096. Replacement cost depreciation on the building amounted to \$28,402 during 1972, while historical cost depreciation on the building totaled \$20,430.

Bank Loans

The objective of replacement cost accounting for bank loans is to adjust the balance sheet and income statement to reflect, respectively, the market value of the debt and the current replacement cost of the interest expense.

If the interest payment on the liability is fixed at the time of issuance, then all subsequent movements in the company's effective interest cost will affect the market value of the obligation. For example, if the interest rate increases, the market value of the liability will decline. This would be reflected on a replacement cost basis by debiting a liability contra-account (to decrease the carrying value of the liability) and crediting holding gains.

Exhibit 1
Test Company

**Comparative Fixed Asset Values
Before Adjustment for Tax Effects**

<u>Method Used to Determine Replacement Cost</u>	<u>Conventional Book Value</u>	<u>Replacement Cost Carrying Value*</u>
<u>December 31, 1970</u>		
Equipment:		
Direct valuation	\$116,567	\$ 93,670
Index adjustment	96,124	102,797
Building-Index adjustment	947,773	1,183,117
Land-Offer price	100,021	1,000,000
<u>December 31, 1971</u>		
Equipment:		
Direct valuation	\$168,375	\$ 156,106
Index adjustment	96,228	103,952
Building-Index adjustment	931,816	1,338,778
Land-Offer price	100,021	1,000,000

* Note: To facilitate comparison, figures in this column do not reflect the adjustment for the absent income tax shield. Hence, they do not correspond to the replacement cost balance sheet figures presented below, which are net of the absent tax shield.

The holding gain reflects the discounted present value of the future benefit to the firm from having borrowed at lower rates than those which currently prevail. The replacement cost interest expense would be the product of the average current replacement interest cost and the face amount of the liability. The excess of replacement cost interest expense over historical cost expense (when rates have increased) would also be credited to holding gains. This excess represents the average savings *during the current period* from having borrowed at an interest rate lower than that currently in effect.

No adjustment was needed to put the test company on a replacement cost basis for bank loans. The reason is that the test company's interest cost was not fixed; instead such costs were tied to the prevailing prime interest rate. That is, its loans were originally granted at, say, a one per cent increment over the prime rate. As the prime rate of the bank changed, so did the company's interest payments. Given these terms, then, *ceteris paribus*, the market value of the liability should be fairly constant⁹ and interest expense should automatically be carried at average replacement cost.

However, even when interest payments are variable (e.g., tied to movements in the prime rate) there is still one possible reason for adjustment

⁹ The market value might change slightly since the proportionate relationship between the prime rate and the interest cost will change if the increment over prime is stated in terms of a fixed amount, for instance, one per cent.

when replacement cost statements are prepared. If the company's credit worthiness had changed between the time of the loan and the period for which the statements were prepared, then the terms of the loan would probably be altered were it renewed upon expiration, and the market value of the existing debt would also change. Thus, even though the interest payments in the test company were variable, it was necessary to determine whether the same increment over prime which was granted when the loans were made would be granted at the balance sheet date.

Direct evidence was available to make this assessment. The test company was continuously rolling over its short-term loans, and the bank kept the increment over prime constant for these renewals. This indicates that the increment was unchanged for short-term loans. Furthermore, the company was exploring options to refinance its long-term loans. In the course of these explorations, another bank offered the company the same increment over prime for a long-term loan of similar magnitude to its existing loan. On the basis of this information, it seemed reasonable to conclude that money could be borrowed currently at the original increment over prime. Accordingly, no adjustment was warranted for replacement cost purposes.

Additional Items

Tax Carryforward. The company's income tax carryforward is included as an asset on the replacement cost statement.

While enterprise continuity is usually assumed on a historical cost statement, accepted traditional principles suggest that a tax carryforward be recognized only when realized. There is no counterpart prohibition against recognizing these carryforwards in replacement cost theory. Rather, the continuity assumption dominates until there is evidence to the contrary. Since this continuity was not questioned for the test company, profitable future operations are assumed and the tax carryforward is treated as an asset. Similar reasoning applies to the investment tax credit carryforward.¹⁰

Stock Options. The test company did have stock options outstanding to employees. Stock options obviously represent a portion of total employee remuneration. It is difficult, however, to measure the value of this consideration. Theoretically, its value is approximated by the employee's own perception of the value of the option, since it is this value which, when added to actual salary payments, induced the employee to provide his services. Because there are no reasonable means for estimating employees' expectations at the time the option was granted, no value was assigned to the options.

¹⁰ The difference between the treatment of these items on the replacement cost statements and the historical cost statements is attributable to the continuity assumption used to prepare the replacement cost statement. Since this treatment is not considered to be generally accepted, it was not used in the unadjusted statement. Thus, the difference shown on the comparative statements is attributable to our desire to use generally accepted accounting procedures on the unadjusted statements; it is not a function of inherent differences in the two measurement methods.

Product Development Expense. This item consisted primarily of salaries of engineering personnel and materials cost. The traditional rationale for treating such items as assets is that they are expected to provide future benefits to the enterprise. Since it is unclear whether the amounts expended (either on a historical or replacement basis) bear even a loose correspondence to the discounted present value of these benefits, no attempt was made to restate this item. Because this item has no tax basis, it is shown net of the absent income tax shield on the replacement cost statement.¹¹ If it had been deemed advisable to adjust this item, a procedure similar to that used for wage adjustments in ending inventory would have been followed.

Cost

The adjustment procedures necessary to prepare replacement cost statements required approximately 160 hours of effort. Half of these hours were spent performing clerical activities and deriving figures which would have been available if market based accounting measures were adopted for reporting purposes.

Conclusions

The sole objective of this study was to determine the feasibility of implementing a replacement cost accounting system in an actual business situation. Studies of this nature represent the initial stage of a lengthy process necessary to accumulate evidence regarding the practicality of replacement cost reporting. Our objective was to provide initial evidence relevant to the question "Are the data available?" Questions relating to the materiality of differences between traditional and replacement cost reports and the objectivity (or dispersion) of replacement cost data are also important and must be addressed after more evidence regarding data availability is gathered.

Very few implementation problems were encountered during the course of the study. In those cases where data were initially absent, it was usually possible to reconstruct the missing information or to develop some surrogate approach. One might reasonably expect that even these occasional problems would diminish were market based measures widely adopted for reporting purposes.

This study has indicated that the test company was already employing what is essentially a replacement cost system for internal inventory accounting. This itself indicates the practicality of the replacement cost inventory procedures more forcefully than any academic study ever could.

With regard to fixed assets, the results were less equivocal but still essentially favorable. Market prices for 62 per cent of the manufacturing equipment (as a percentage of original historical cost) were readily avail-

¹¹ On the historical cost statements, the absent tax shield is depicted in the deferred income tax account. Obviously, this account also reflects the income tax allocation effects of many other items.

Exhibit 2
Test Company
Comparative Historical Cost and Replacement Cost Balance Sheets
December 31, 1970 and December 31, 1971

	12/31/70		12/31/71	
	Historical Cost	Replacement Cost	Historical Cost	Replacement Cost
Assets:				
Current Assets				
Cash	\$ 36,288	\$ 36,288	\$ 1,958,494	\$ 1,958,494
Accounts receivable	3,584,150	3,584,150	1,761,479	1,761,479
Inventory (pp. 229-236) *	2,548,674	2,565,364	3,085,922	3,100,316
Prepaid expenses	129,254	129,254	125,923	125,923
Income taxes receivable	<u>\$ 6,298,366</u>	<u>\$ 6,315,056</u>	<u>\$ 8,227,491</u>	<u>\$ 8,241,885</u>
Fixed Assets				
Land (pp. 237-238)	\$ 100,021	\$ 1,000,000	\$ 100,021	\$ 1,000,000
Building (net of accumulated depreciation (pp. 237-238))	947,773	1,015,475	931,816	1,073,512
Equipment (net of accumulated depreciation (p. 237))	212,691	185,221	264,603	238,689
	<u>\$ 1,260,485</u>	<u>\$ 2,200,696</u>	<u>\$ 1,296,440</u>	<u>\$ 2,312,201</u>
Miscellaneous				
Other assets	\$ 14,483	\$ 14,483	\$ 4,793	\$ 4,793
Product development expense (p. 241)	300,059	156,031		551,200
Income tax carryforward (p. 240)				50,000
Investment credit carryforward (p. 240)				
	<u>\$ 314,542</u>	<u>\$ 170,514</u>	<u>\$ 4,793</u>	<u>\$ 605,993</u>
	<u>\$ 7,873,393</u>	<u>\$ 8,686,266</u>	<u>\$ 9,528,724</u>	<u>\$ 11,160,079</u>
Total Assets				

	12/31/70		12/31/71	
	Historical Cost	Replacement Cost	Historical Cost	Replacement Cost
Liabilities and Equities:				
Current Liabilities				
Short-term note payable (pp. 238-240)	\$	\$	\$ 2,750,000	\$ 2,750,000
Trade accounts payable	1,103,333	1,103,333	1,361,109	1,361,109
Sales commissions	175,242	175,242	31,289	31,289
Payroll, income and local taxes	267,514	267,514		
Current portion—long-term debt	\$ 1,546,089	\$ 1,546,089	37,400	37,400
Long-term and Other Liabilities			\$ 4,179,798	\$ 4,179,798
Notes payable (pp. 238-240)	\$	\$	\$ 756,050	\$ 756,050
Deferred income taxes payable (pp. 240-241)	65,000		65,000	
	\$ 65,000	\$	\$ 821,050	\$ 756,050
Shareholders' Equity				
Common stock	\$ 360,140	\$ 360,140	\$ 361,421	\$ 361,421
Paid-in capital	1,848,444	1,848,444	1,864,810	1,864,810
Retained earnings	4,088,123	4,965,996	2,301,645	3,998,000
Treasury shares	\$ 6,296,707	\$ 7,174,580	\$ 4,527,876	\$ 6,224,231
	(34,403)	(34,403)		
	\$ 6,262,304	\$ 7,140,177	\$ 4,527,876	\$ 6,224,231
Total Liabilities and Equities	\$ 7,873,393	\$ 8,686,266	\$ 9,528,724	\$ 11,160,079

* Page numbers in parentheses refer to text discussion of those items adjusted.

Exhibit 3
Test Company
Comparative Historical Cost and Replacement Cost Income Statements
Year Ended December 31, 1971

	<i>Historical Cost</i>	<i>Replacement Cost</i>
Sales	\$ 3,994,256	\$ 3,994,256
Cost of goods sold (pp. 229-236)*	2,938,542	3,051,705
	<u>\$ 1,055,714</u>	<u>\$ 942,551</u>
Period Expenses:		
General and administrative	\$ 619,170	\$ 621,173
Research and development	1,046,706	1,046,706
Marketing	2,011,414	2,011,414
Corporate general and administrative	331,260	331,260
Interest	158,553	158,553
Special items (product development expense (p. 241))	301,389	157,361
	<u>\$ 4,468,492</u>	<u>\$ 4,326,467</u>
Operating loss	<u>(\$3,412,778)</u>	<u>(\$3,383,916)</u>
Holding gains (pp. 234-236)		188,420
Loss before income taxes	<u>(\$3,412,778)</u>	<u>(\$3,195,496)</u>
Federal and state income taxes	(1,626,300)	(1,626,300)
Net loss (ignoring carryforwards)	<u>(\$1,786,478)</u>	<u>(\$1,569,196)</u>
Income tax and investment credit carryforward (p. 240)		601,200
Net loss	<u>(\$1,786,478)</u>	<u>(\$ 967,996)</u>

* Page numbers in parentheses refer to text discussion of those items adjusted.

able. While the remaining portion of the equipment was valued by index adjustment, this was largely dictated by time constraints. It is possible that some portion of these assets could also have been valued directly.

Land was valued directly, although conservatively, by reference to a rejected offer that the test company had recently received. While cost considerations led to an index adjustment for the building, direct appraisal is a preferable, and obviously available, alternative in realistic circumstances.

On the basis of these results, it would appear defensible to conclude that the data necessary to prepare replacement cost financial statements were generally available. Thus, this case study did not disclose any obstacles which would impede the implementation of replacement cost reports. Whether this conclusion can be generalized to other situations is a subject for future research.