Indexing isn’t just a mathematical tool for the statistician but can be used effectively by contractors

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When prices of construction materials and services are rapidly changing, as they obviously have been during the past year, methods of quantifying these changes become increasingly important.

We hear and read much about the rising “cost of living” or “building costs” or “material price jumps”—or the loss in “purchasing power of the dollar.”

If the cost of living, for example, is said to have gone up 4 percent, this reflects an attempt to quantify the effect of many price changes on our domestic existence. And it growingly reflects itself in the wages you pay to craftsmen and others because of the so-called “escalator clauses” which are contained in so many of today’s labor relations contracts.

To demonstrate an earlier use of “cost of living” adjustment in wages, in 1780, Massachusetts soldiers were paid notes, the value of which was to vary with the price of a selected group of commodities:

Both Principle and Interest to be paid in the then current Money of said State, in a greater or less Sum, according as Five Bushels of Corn, Sixty-eight Pounds and four-
seventh Part of a Pound of Beef, Ten Pounds of Sheep Leather shall then cost more or less, than One Hundred and Third Pounds current Money, at the then current prices of said Articles.

As any wall and ceiling contractor knows, the Federal Government currently adjusts the pensions of government retirees for changes in the “cost of living” by means of the Consumer Price Index.

To the great interest of industry and unions, the Bureau of Labor Statistics publishes the CPI monthly and this reflects the measurement of price changes in some 300 goods and services purchased by a typical family for normal domestic use.

The specific goods and services that go into this “market basket” and the assumptions from which a final number is calculated swirl in controversy—and even now the government is making profound changes in the components used.

To a wall and ceiling contractor—especially one who has experienced the uncomfortable task of responding to last year’s rapid and dramatic jump on gypsum wallboard prices, the use of a good index is almost imperative. When a contractor has bid—perhaps for a job that won’t even start until some future date—a firm figure and then must absorb large and unexpected price increases in his materials, the stage is set for anxiety at the best and bankruptcy at the worst.

Can a knowledge of indexing help?

It certainly can give a contractor a better idea of what has happened to his prices in the past and maybe give a greater insight or forecast for future trends—provided they remain consistent with past history.

In the absence of any method for quantifying his price and cost experiences, the contractor does not learn from his own history. And it has been remarked more than once that he who forgets the lessons of history is condemned to repeating his mistakes.

**Methods For Using the Indexing System**

There are several means available to estimate current or retrospective costs of materials and labor. The use of cost indexing applied to known, recorded costs is merely one of this variety of techniques—but it is one of the best for representing the change in cost of a commodity, or group of commodities, over a definite period of time.

The prices which are the foundation of an index must relate to a special commodity. An index of wallboard, for example, must be based on the price changes of a specific quantity and type of board, such as a 4’ x 12’ fire coded 5/8” board.

It is also most important that the measured quantity and type remain constant so that any price movement represents a true price change rather than a change in quality. This can become a difficult problem when a price is required over a long period because manufacturers do change the composition and quality of the board.

It has been said that whiskey is the only common product which has remained relatively unchanged since Colonial times.

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Nor does the cost index for, say, wallboard, bear any relationship to that of drywall screws—unless the indexes are carefully constructed for this purpose. Similarly, the cost indexes for the same commodity in two geographical locations may not be directly comparable.

**Computation of Element Indexes**

To compute a price index for a single commodity, a series of prices must be obtained covering the required period of time for a definite quantity and quality of the item. Index numbers are usually computed on an annual basis, but in the case of rapid, successive price changes could be computed for shorter time periods to good advantage.

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Index numbers are computed by relating each annual price in the series to one of the prices which has been selected as the base. The year in which the price was effective is the base year.

If it is assumed that wallboard of the specification mentioned earlier sold at dealer prices of $94.00 per thousand in December, 1977, and sold at $81.00 per thousand in December, 1976, and at $53.00 in December, 1971, the indexing would run as follows: 1971—$53.00, 1976—$81.00, 1977—$99.00.

Using 1977 as the base year, each price related to the 1977 price of $99.00 is:

a) 1971 price = 1971 index number
   1977 = 1977 base year
   $53.00 = 0.54
   $99.00

b) 1976 price = 1976 index number
   1977 = 1977 base year
   $81.00 = 0.82
   $99.00

When the 1977 price is expressed as 1.00, the 1971 price can be expressed as 0.54. It is convenient to think of index numbers as percentages, with the base year as 100 percent. Thus, the ½" tire coded 4' x 12' board’s dealer prices in 1971 were only 54% of what they are as of December, 1977, and the same commodity in 1976 was only 82% of what is was in 1977.

Looked at, too, from a different perspective, prices in December, 1977, for this type of wallboard are nearly double—almost 100%, that is—over what dealers were paying the manufacturers for stock in 1971. The price increase just since last January, 1977, has been approximately 40%-50% in most sections of the country.

Computing Composite Indexes

Most price indexes—such as the CPI—are the results of combining several commodity indexes. The use of these indexes will give a contractor a rather good idea of his productivity—and also lends itself to getting a helpful sighting on the pricing tactics of his competitors.

For example, assume that the goal is to calculate an index which will represent the changes in the cost of constructing a brick wall, so it will reflect changes in labor cost as well as that of brick.

Say it requires 8 hours of mason labor to lay 1,000 bricks. In 1960, the figures might run like this:

\[
\begin{align*}
1000 \text{ brick} & @ \$43.75 = \$43.75 \\
8 \text{ hours} & @ \$4.38 = \$35.04 \\
& = \$78.79
\end{align*}
\]

If the same unit of wall in 1969 costs $115.92, the index, base 1969, would look like this:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>$78.79</td>
</tr>
<tr>
<td>1969</td>
<td>$115.92</td>
</tr>
</tbody>
</table>

\[
\text{Index } 1969 = \frac{100 \times 115.92}{78.79} = 140
\]

Since the brick wall cost index is definitely affected when the price movement of brick and bricklayer is combined in different proportions, a composite index may be called sensitive to the proportions of the element indexes which comprise it as well as to the methods used in the combination.

The method above is the “market basket” approach—the same used in the composition of the CPI—which must be changed as soon as there is any change in one of the elements going into the “basket.”

For a final example, a composite index for commercial building construction would contain an element index for interior partitions. In the 1940s, this would reflect lathing and plastering but would be based primarily on drywall in recent years.

If the composite index were applied to a 1940 cost in order to express it in current dollars, this cost will change for some period of time based on lathing and plastering and after that based on drywall.

The assumption that the cost of lathing and plastering, if it had remained the primary wall building material, would have changed in the same way that the cost of drywall has changed, may or may not be true at all.

Regardless, some convention must be adopted to provide continuity so that practical trending becomes possible. And, finally, the best way to present cost indexes is to make up a graph which facilitates an understanding of the trends. The latter are not so easily detected by reading rows of numbers.