

THE IMPACT OF STEEL PRICING ON BUILDING CONSTRUCTION

BY JOHN P. CROSS, P.E.

There's no doubt that material costs affect overall construction costs. The question is, how?

SINCE DECEMBER OF 2003 THE SQUARE FOOTAGE cost of non-residential building construction has increased by 29.4% compared to a Consumer Price Index increase of 17.5% during that same period. The increasing cost of building projects has been driven in large part by increases in the cost of construction materials, which have risen 39% over that same period; *all* construction materials, including concrete, lumber, gypsum, copper, plywood, and all types of steel, have increased in cost during that period of time. At various points during the past four-plus years, each of these construction materials has been blamed for the run-up in construction costs.

Last quarter this column took an introspective look at structural steel and examined the dynamics impacting the fabricated cost of structural steel. Yet understanding the price dynamic of structural steel only answers half the question. The remaining question is, how do increasing (or decreasing) steel prices impact the overall cost of a project?

A Small Contribution

If the question is limited to just structural steel, then it is necessary to consider the incremental impact that a \$100 per ton change in the producer price of structural material would have on the overall structural package for the project. In today's marketplace material costs represent 30% to 35% of the cost of fabricated and erected structural steel. At the current mill price, a \$100 change in material price would result in a 3.5% increase in the cost of the structural steel package.

The structural steel package is between 10% and 12% of the overall cost of a typical project. This means that a \$100 change in the mill price of structural steel will result in an increase in the range of 0.4% in the overall cost of the project. This relationship is substantiated by index data from the Bureau of Labor Statistics (BLS) that tracks both the mill price and fabricated/erected price of structural steel. Since January of 2004 the rate of change in the fabricated/erected price has been almost exactly one-third of the rate of change in the mill price. Since late 2003, the typical increase in the cost of fabricated/erected structural steel has been 35%, result-

ing in a contribution to overall construction costs in the range of 4% to 5%.

Yet, construction costs have increased substantially more than 5%. It must be noted that the previous discussion was limited to the impact of *structural* steel costs on a project; steel of *all* types is used throughout a project. Steel price increases impact the cost of piping systems, ductwork, metal studs, decking, façades, elevators, escalators, nails, wiring, electrical components, window frames, sprinkler systems, and, most certainly, reinforcing steel used in concrete construction. A study completed in 2004 by Boyken International determined that for every \$100 change in the average cost of *all* types of steel, the average impact on project costs would be 3.5%. The study further distinguished between structural steel-framed projects and concrete-framed projects, with the impact of changing steel prices on the former being 3.8% and 3.3% on the latter. The study did not consider the impact of the changing cost of other materials, such as increasing concrete or lumber prices, on the differential. Based on the findings of this study, the overall contribution of changing steel prices from late 2003 until early 2008 would be approximately 18%. So, the vast majority of the cost impact of steel in a structure is *not* a function of the structural steel frame.

Diminishing Advantage?

So what does this mean for the designer responsible for selecting structural framing systems? Has the historic cost advantage of structural steel evaporated? Over much of the past five years, the increasing cost of concrete and lumber used in form work, along with escalating labor rates for site-intensive concrete work, has offset the 0.5% differential between structural steel-framed projects and concrete-framed projects. A study of national construction rates, using data from R.S. Means that covers the past five years, indicates that the relative cost differential between structural steel and concrete framing remained at its traditional level. The study focused on the construction cost of the structural frame of an eight-story, 20,000-sq.-ft office building and indicated a \$255,000 advantage for structural steel through 2006.

As a result of the significant downturn in residential construction and a slowing of public infrastructure work, the U.S. cement industry is currently experiencing a significant over-supply condition that's driving down cement prices.



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This decrease in cement prices has been offset by increasing aggregate and fuel-related ready-mix transportation costs, resulting in flat ready-mix prices for the past 12 months. This has resulted in a narrowing of the cost advantage of a structural steel frame over a concrete frame from 8% to 5%. But the advantage remains with structural steel.

The same is true when overall project costs are considered and the secondary cost benefits of a structural steel frame are considered. The cost advantage of structural steel increases when items such as the reduction of foundation loads and shorter construction periods reducing general conditions are considered.

Be Aware

The designer responsible for selecting the framing system for a building project must be cognizant of the price dynamics of construction materials impacting the cost of the project. However, the selection of a framing system based solely on initial cost estimates at the time of design is uncertain at best, as pricing levels have shown a recent history of rapid increases and decreases inconsistent between materials. Interestingly, the greatest opportunity for cost savings on projects in a volatile market does not rest with the choice of materials, but rather with the selection of a project delivery methodology. It is critical to recognize that the method of project delivery and the early involvement of a specialty contractor (structural steel or concrete) will have a far greater potential for reducing the overall cost of the project than will the selection of an alternative framing material. MSC

Next edition: The economic impact of collaborative project delivery.