

By Jeff Carowitz, Strategic Force Inc

True Value

New Survey Finds That Value Engineering Is on the Rise Despite Negative Outcomes

The trend toward value engineering in building construction — the practice of replacing originally specified materials with alternate, and often cheaper, materials — has been underway for years. With a protracted construction downturn, the practice is becoming more widespread. My research firm, Strategic Force Inc., was retained by a client in the plumbing industry to learn just how pervasive the trend is and, more importantly, whether the practice was resulting in improved or positive outcomes for owners and developers and what engineers are doing to educate their clients on the issue.

To find out, more than 3,000 professionals affiliated with leading plumbing and mechanical engineering firms were asked to complete a brief web-based questionnaire on their experiences with value engineering of plumbing and drain, waste and vent (DWV) piping systems. The results paint an interesting picture of the current practice of value engineering.

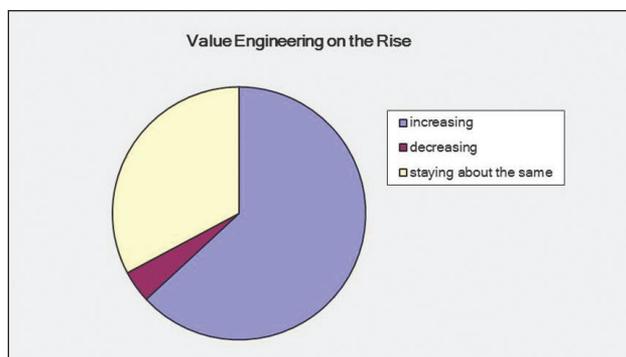
Under our current economic conditions, it is no surprise to find that, compared to two years ago, 63 percent of engineers reported that the number of value engineering requests on their projects was increasing. When it comes to the materials most often being substituted, the survey revealed that cast iron soil pipe and fittings are frequently targeted in value engineering initiatives. A stunning 61 percent of respondents reported that it happens with more than 50 percent of their cast iron piping specifications. Only 12 percent say that it almost never or has never happened.

When asked what factors are driving value engineering of plumbing and DWV specifications, the most common

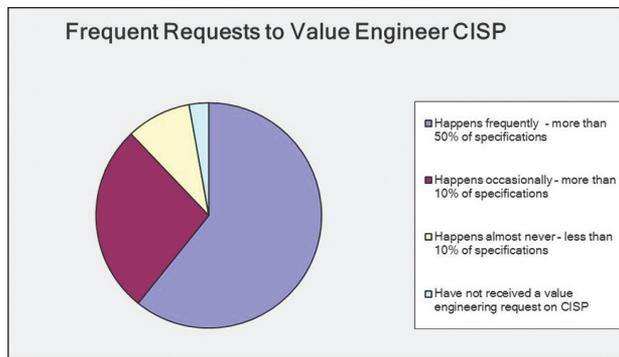
answers were that owners were seeking to reduce overall project costs (77 percent) and that contractors wanted to substitute lower cost materials (76 percent). Only a few (15 percent) reported that contractors used the practice to suggest better or new products.

Digging deeper into some of the responses provides context to the issue. Estimating projects has been more challenging during the economic recession. In the opinion of some respondents, cost estimations issued by contractors are often inaccurate. Contractors hungry for work lock in projects with low bids, attempting to gain profitability later through cost reductions. Rather than adjust the project budgets to accurately reflect costs, “they burden the design team with ‘value management’ proposals that contain inferior products or installation methods.” In other words, according to one engineer, “the term ‘value engineering’ is often substituted for what is actually ‘cost cutting,’ without any plumbing engineering expertise [involved] in the decision.”

But engineers do try to provide input. According to the survey, 80 percent of engineers advise their clients on which value engineering changes make sense and which might lead to negative outcomes. Almost two-thirds of engineers reported that they are often asked to accept value engineering changes that don’t agree with their recommendations. Some engineers expressed frustration that many requests are not in the best interest of their client and that they often don’t have the time or the resources to build a case against value engineering options that might negatively impact a project.

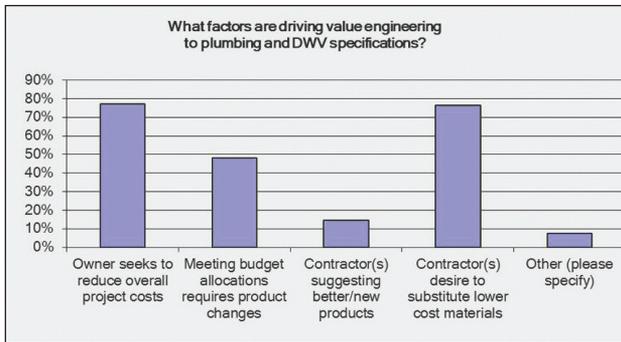


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Value Engineering



The most common factor driving value engineering is a desire to reduce overall project costs.

In fact, the most jaw-dropping finding in the survey was that nearly three-quarters of all value engineering changes have a negative outcome. Only 27 percent of value engineering changes to plumbing and DWV systems contribute positively to the quality, longevity and function of the finished project, according to the survey. Not a very high success rate for such a common practice.

In fact, more than one-third of changes from cast iron soil pipe to plastic in plumbing piping systems resulted in failure, which costs owners, developers, contractors and even engineers time and money to fix and can often wipe out — or even exceed — the original cost savings estimates from the changes.

These changes are often made, according to engineers, despite cast iron's history of positive results, particularly when it comes to sound attenuation, longevity, ability to withstand earth and live loads underground, thermal expansion characteristics and easier, more reliable, fire penetrations; all reasons that engineers reported when asked why

they specify cast iron for plumbing piping systems in commercial construction. Even something as seemingly trivial as the potential for water in a system to exceed 140°F or not using enough properly spaced hangers can lead to a failure of a plastic DWV system.

In the course of conducting the survey, we came across a number of anecdotes of specific failures that occurred when substituting plastic for iron in DWV systems. In one project that involved kitchen waste pipe below slab, "high temperature waste, combined with poor trench backfill practice, caused the pipe to deform, which resulted in a blockage. The piping was destroyed the first time a large auger bit was used to attempt to clear the blockage."

In another system, the plastic storm piping trench was "run over with machinery, which collapsed it." In a laundry facility, a "temperature and pressure relief valve allowed excessively hot water into the underslab drain piping," causing a failure that had to be torn out and replaced with cast iron, a scenario that could occur in any building with a water heater drained to the DWV system.

The results of this survey indicate that all parties in the construction chain need to make the right considerations when evaluating whether to make changes to engineered designs and specifications. What is often intended as a good faith effort to save money can instead lead to failures, rework and lost money. It's typically not the quality of the substituted product that causes the failure; it is simply not using the right materials for the right applications. Taking that into consideration is truly adding value. ■

Jeff Carowitz is principal of Strategic Force Inc. and has more than two decades of experience in research in the building trades.