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Tilt-Up Reduces Total Cost of Building Ownership

One of the iconic sayings attributed to Benjamin Franklin is “an ounce of prevention is worth a pound of cure.” In layman’s terms, this means that it is better to avoid problems in the first place, rather than trying to fix problems once they arise.

While this adage is often used in relation to health management, it can also be applied to building ownership and new building construction.

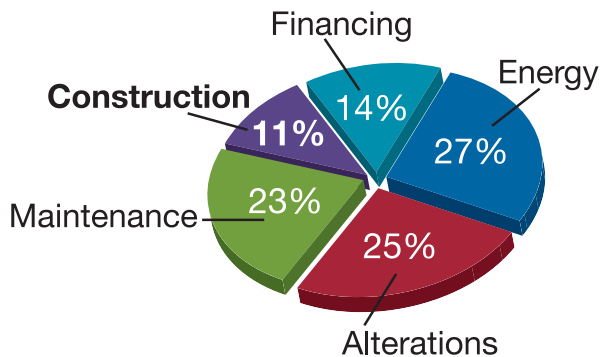
Industry studies have proven that the initial capital cost is only a fraction of the total cost of building ownership. In particular, one study by the Building Owners and Managers Association (BOMA) estimates that the capital cost of construction accounts for only 11% of the total cost of building ownership. Energy, maintenance, and alterations each have more than twice the impact on total cost.

A similar study by The National Research Council places the capital cost of construction at 15% of the total cost of building ownership. Whatever the number, the message is the same – building owners who focus solely on minimizing the capital cost of construction are wasting an opportunity to positively impact 80-90% of their costs. Unfortunately, though, the cost of short-sighted upfront decisions is only realized once a building is occupied—when it’s too late to make changes.

Looking to Benjamin Franklin’s advice, the best way to reduce total cost of building ownership is to prevent operating inefficiencies during initial design and construction. This way, building owners can avoid the long-term costs of operating and maintaining an inefficient building.

Tilt-up construction combines the best of both worlds by allowing building owners to positively impact both the capital cost of construction and the total cost of building ownership.

Total Cost of Building Ownership



While the tilt-up product delivers construction savings, it can have an even greater impact by minimizing long-term costs.

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Tilt-Up Reduces Total Cost of Building Ownership

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Reducing Capital Costs

In the August 2011 issue of *The Construction Specifier*, Jeffrey Brown, co-founder of Powers Brown Architecture in Houston, Texas, coined the phrase “value office” when describing how tilt-up improves typical office construction. According to Brown, in most suburban markets, the tilt-up office product averages \$7 to \$10 per square foot less for the exact project built conventionally.

Typical office construction for “class A” space includes a steel or concrete frame with veneer cladding and perimeter columns. Tilt-up improves upon this conventional product, since it is more efficient to plan with no perimeter columns. It also accepts any exterior cladding material and offers column-free glazed corners. The economy of design that makes tilt-up cost effective for office building construction – replacing the construction of perimeter structural framing and non-structural veneer cladding with a single component – provides the same capital cost advantages when applied to other markets as well.

Reducing Energy Costs

According to simulations by the National Institute of Standards and Technology (NIST), air barrier systems in commercial and industrial buildings are estimated to reduce air leakage by up to 83 percent. This reduction translates into gas bills lowered by more than 40 percent, and electrical consumption decreased as much as 25 percent. Unfortunately, conventional construction practices do not currently yield an airtight building because of the difficulty in tying together multiple materials that comprise the exterior skin of the building.

Fortunately, tilt-up construction does not suffer from this difficulty. According to the International Energy Conservation Code (IECC) building code, tilt-up by itself acts as an air barrier. No additional materials are needed to create the air barrier layer – the concrete is the air barrier layer. Only the standard practices of caulking at doors, windows and panel joints and terminating the roof membrane is required to complete the air barrier—much simpler and more reliable with tilt-up than with other cladding systems.

To complement this superior air barrier performance, tilt-up buildings can also be constructed with insulated sandwich wall panels, providing a performance R-value that exceeds the material R-value provided by the insulation alone.

As evidence of this advanced air barrier and thermal performance, SiteCast Construction (CON/STEEL Alliance™ member in Ottawa, Ontario) has



Even at 4,000 square feet larger, this tilt-up school uses less electricity and natural gas than a nearby school built with conventional brick and masonry.

gathered data from two elementary schools built in Cumberland, Ontario. The first school measures 49,000 square feet and was constructed in 1996 using conventional brick and masonry construction for the exterior wall. The second school measures 55,000 square feet and was constructed by SiteCast in 1999 using insulated tilt-up concrete wall panels. The data

shows that the second school uses 23% less electricity and 35% less natural gas on a daily basis, despite being 4,000 square feet larger. These reductions translate directly into operational savings for the school board, which has a greater budget impact than the original capital cost of construction.

Reducing Maintenance Costs

Building maintenance costs are challenging to quantify, especially when separating the costs of individual components and comparing one method of exterior envelope construction to another. Historically, though, the durable nature of tilt-up construction has proven to reduce maintenance costs.

Functioning as the exterior structure and skin, tilt-up can be provided with truly “maintenance-free” finishes such as exposed aggregate or cast-in-brick. Compared to traditional brick veneer construction, the cast-in-brick eliminates the future risk—and costly repair—of tuck-pointing or cleaning efflorescence.

Intuitively, tilt-up wall panels are also less prone to damage than lightweight systems such as metal siding or EIFS veneers. To combat this lack of durability, many such buildings are commonly built with a masonry wainscoting. While providing durability not found in the metal siding or EIFS, this masonry wainscoting adds initial cost to the projects, as well as potential long-term maintenance costs.

Summary

The longer you own a building, the greater the impact of inefficient operating costs. The easiest way to reduce total costs is to incorporate operating efficiency into the design and construction of the building. Tilt-up construction allows you to build in long-term efficiencies, while keeping capital costs to a minimum.

Tilt-Up Cooler Improves Quality of Life in Haiti

Agriculture and food production can help build economies for countries like Haiti. But, the extreme heat makes it difficult to preserve fresh produce. For one farm in Haiti, a tilt-up cooler was the perfect solution.

Double Harvest, an organization that develops agricultural projects in Third World countries, has been working with Haitians to improve their quality of life for more than 30 years. But, they needed a better way to preserve crops.



Through a mutual relationship, CON/STEEL Alliance™ member STAR Inc. of Amherst, Ohio, partnered with Double Harvest to build a tilt-up concrete cooler. The 2,400-square-foot cooler features insulated concrete roof and wall panels to create the optimal thermal envelope. The cooler has a center dividing wall so farmers can control their energy consumption when only one side is being used.

STAR completed the cooler during four trips over four years, with each trip focusing on a different aspect of the tilt-up process—foundations, floorslab, forming and casting panels, and lifting panels.

Since they couldn't take all the tilt-up construction materials they needed on a plane to Haiti, the team had to rent a crane, and ship a lifting truss, as well as other necessary items. Unlike most tilt-up projects, the tilt-up panels cured for more than a year. When the panels were lifted, the bondbreaker worked as intended, and the panels were erected with ease.

Kim Mulder, president of STAR, said that he welcomed the opportunity to make a difference in people's lives by leveraging the company's expertise in tilt-up. He knew tilt-up was the right answer for this building, which will serve the community well into the future.

This project is a simple cooler, but it will improve the quality of life for many in need.

