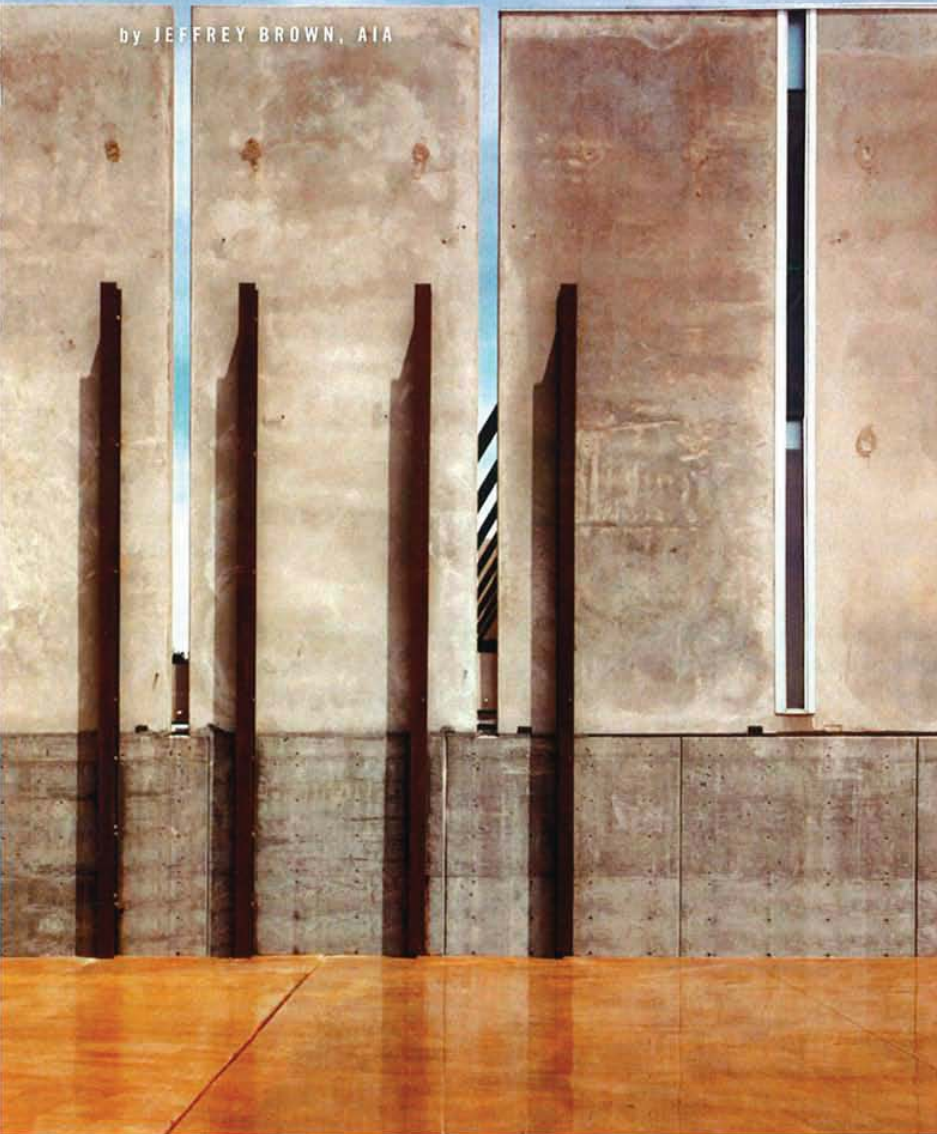


Neglected Territory

Notes on the architectural potential of tilt wall construction

by JEFFREY BROWN, AIA



seen as a commodity-oriented approach to construction; 3) it does not fit the current research agenda of architectural academics; and 4) it lacks a clear categorization as an activity—is it mere building, a technique, or a technology, and is there a distinction between these categorizations?

Obscure Origins

The history of tilt wall construction is in many ways what retards it from architectural interest. It lacks the pedigree of material developments such as concrete, which it simply exploits. Unlike “Chicago frame” or “balloon frame” construction technologies, which both are far more integrated with architectural history, it has more in common with parochial methods of building, such as “barn raising” — at least as a commercial application of the technique rather than as any kind of communal activity — which have little traction in architectural literature. A number of sources record a very small amount of information regarding the development of tilt wall construction. These sources tend to be professional trade organizations, affiliations of the concrete industry or, in one case, a brief foray into tilt wall construction from an amateur history on Irving Gill.¹ Tilt wall construction receives only notational mention in Ford’s *Details of Modern Construction* and is not addressed in Frampton’s recent *Studies in Tectonic Culture*, arguably two of the more dominant history/theory works that circumscribe construction’s role in architecture.

Tilt wall was apparently invented as a result of early nineteenth-century developments and experiments into reinforced concrete. Robert Aiken, an army engineer, pioneered the technique of pouring walls on slabs and tilting them into place as rifle range target abutments. He translated the procedure to that of producing free-standing walls and eventually buildings from circa 1906. Aiken’s innovations were arguably more focused on the technology for actually tilting the panels into vertical position than in the material, reinforcing, and/or aesthetic aspects of the method. Other significant practitioners were limited, but interestingly Thomas Edison created a cluster of tilt wall buildings in 1908 at Union Village, New Jersey, that still exists today.² As is the case with many innovations from banking to manufacturing, World War II and its economic aftermath sponsored great interest in utilizing the technique as it reduced construction time in the creation of

IGNORED BY MANY ARCHITECTS and most academics, tilt wall construction is nonetheless widespread. It is prevalent in the marketplace and ubiquitous on the landscape, yet tilt wall construction is considered a “low” form of building methodology utilized in commercial construction by “mainstream”

architects and their co-conspirators in the building trades. As a result, tilt wall construction has been overlooked as an area for more extensive architectural exploration. There are several reasons, including: 1) Its history and development has largely occurred outside of the traditional realm of architecture; 2) it is

large warehouse and factory facilities. In the 1920s, tilt wall construction interested Irving Gill who experimented with it in several projects, none of which was significant in his opus, with the possible exception being the La Jolla Woman's Club and Clubhouse.³ Some would argue that it has been the tilt wall industry that has revived Gill on this subject, not Gill who pushed it forward in history.

Commodity vs. Cultural Expression

The relatively meager interest exhibited by leading-edge architecture practitioners⁴ is caused by the historical development of tilt wall construction as largely the by-product of engineering efficiency, not as the medium of any desirable cultural repository. Certainly other methods of building and engineering obtain to efficiency and economy but apparently none are as aesthetically unexploited as tilt wall construction. Tilt wall construction does not, upon first glance, appear to be a reasonable method for constructing a museum. Yet do we place more value on the complexity of the spatial experience a building provides or on the appearance of complexity in the construction?⁵

Tilt wall construction is boldly driven by its economy. At first glance it is a commodity with almost no pretension to any kind of "meaning." This, of course, is both its attraction – globally, because it is "cheap" and easy to perform in low-tech labor pools – and its challenge. It is not an "indigenous" or for that matter local, traditional, or any other culturally pre-loaded approach to building. It evolved as a method of building almost completely outside of accepted cultural expression and certainly in the very shadows of traditional architecturally relevant technologies. Implementation of tilt wall construction was driven by the engineering impulses of expediency and simplification.

Technique, Technology, and Tectonics

Proposing just how tilt wall construction can have more import to designers requires it to be defined more precisely as a technique, a technology, tectonics, or some amalgamation of all three concepts. Tilt wall construction is not by its nature "material dependent," although it is almost ubiquitously executed utilizing conventional formulations of concrete. It could presumably be executed in structural polymer should one be invented. Simply defined, it is the method of site-casting concrete panels, reinforced with steel or fiberglass, that are sub-

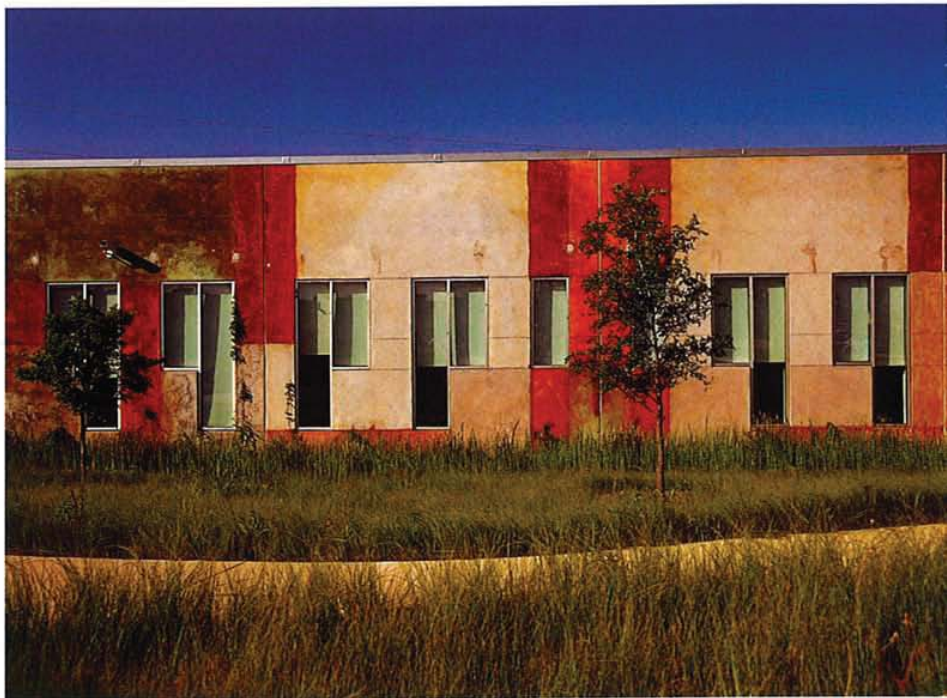
sequently tilted into their permanent vertical location. These panels can be utilized as load-bearing walls or simply as cladding/enclosure. It differs from pre-cast construction, among other things, as it does not require transportation to

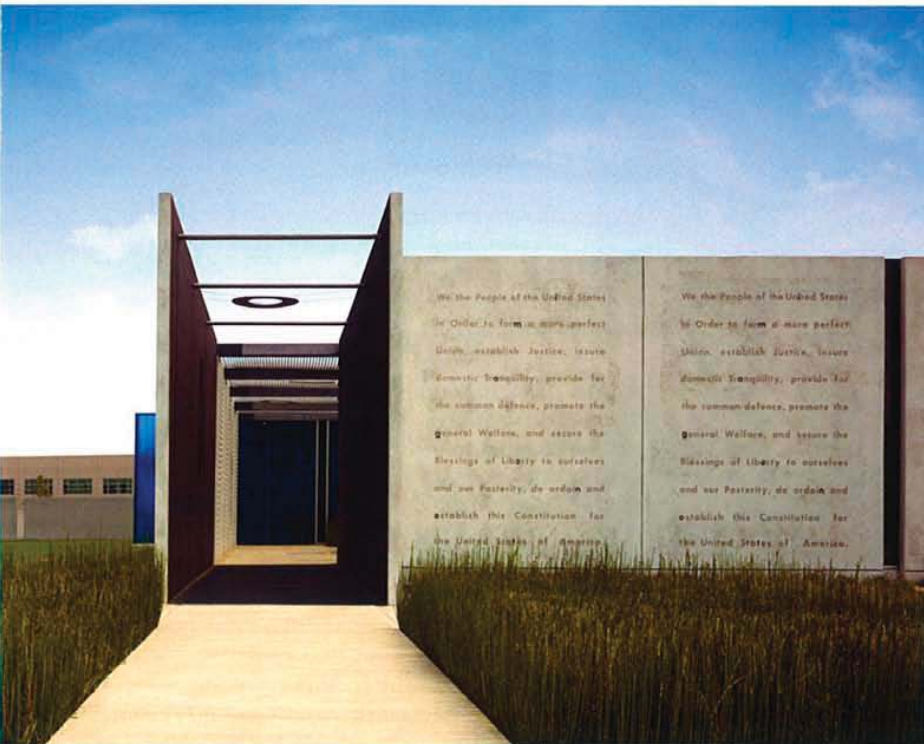
... the issue of tilt wall construction's potential expressivity comports with the notion of tectonics as the combination of structure and construction as a vehicle of intention and meaning. Architecture exists in the entirety of its productive processes.

the site. It also can achieve much larger panel sizes and can be, in most cases, completed more expeditiously than pre-cast structures. The basic process can be summarized as follows:

A tilt-up construction project begins with job site preparation and pouring the slab. During this phase of the project, workers install footings around the slab in preparation for the panels. The crew then assembles the panel forms on the slab. Normally, the form is created with wooden pieces that are joined together. The forms act like a mold for the cement panels. They provide the panels' exact shape and size, doorways and window openings, and ensure the panels meet the design specifications and fit together properly. Next, workers tie in the steel grid of reinforcing bars into the form. They install inserts and embeds for lifting the panels and attaching them to the footing, the roof system, and to each other. The slab beneath the forms is then cleaned of any debris or standing water, and workers pour concrete into the forms to create the panels... Once the concrete panels have solidified and the forms have been removed, the crew connects the first panel to a large crane with cables that hook into the inserts. The size of the crane depends on the height and weight of the cement panels, but it is typically two to three times the size of the larg-

(opposite page) The design of the K.J. McNitt Construction building by Elliott + Associates Architects results in a living illustration of the concrete panel construction process. (below) A structural concrete skin made of crudely stained tilt-up panels gives subtle expression to the Texas Utilities Customer Service Center by Cunningham Architects. The building's skin fits in with the surrounding rural and industrial landscape.





(above) Tilt wall construction was used in the design of the ImageNet Houston building by Elliott + Associates Architects. The project emphasized economy and expandability. (below) The Pickle Elementary School/Virginia Brown Community Center, designed by TeamHaas Architects now Nelsen Partners, incorporated concrete tilt-wall panels which form the spine of the building. Window and door openings were created by the edges of the panels, simplifying formwork and fabrication time.

est panel. The crew also attaches braces to the tilt-up panel. The crane lifts, or “tilts up,” the panel from the slab into a vertical position above the footings. Workers help to guide the concrete panel into position and the crane sets it into place. They connect the braces from the tilt-up panel to the slab, attach the panel’s embeds to the footing, and disconnect the cables from the crane. The crew then moves to the next panel and repeats this process.⁶

There are literally hundreds of variables and adaptations to this process that make tilt wall much more flexible than other “low” forms of construction, such as pre-engineered metal buildings. Those variables include finishes, forms utilized in the casting face, the ability to cast curved panels, penetrations, integrally casting other materials both translucent and natural, and so on. But as outlined above, does it have the desirable attribute that current academic trends require of research subjects? That is to say, is it a technology? Many have argued that technology is not to be used to measure the

correctness of form without offering parameters within which technology is to be understood. I will offer that if tilt wall remains a mere technique, it is limited to being understood as only an aspect of building—a distant cousin to “pargeting”⁷ or running bond. So we must

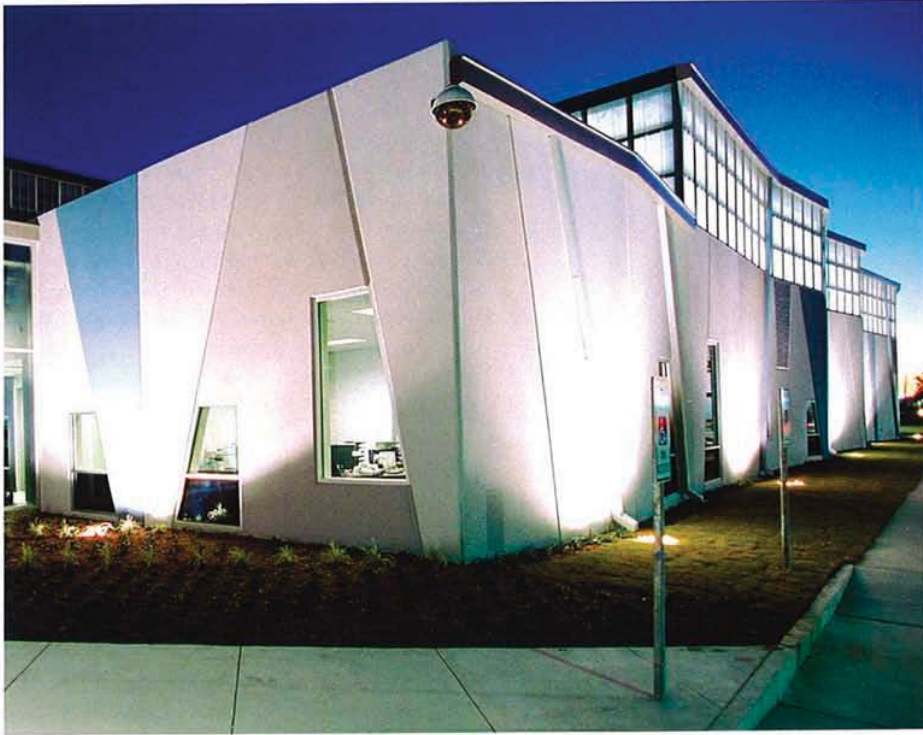
define the difference between technique and technology. The matter is a simple one: technology relates in most sources to the “system”⁸ of an activity, while technique is used to describe the execution of a “part”⁹ of a system. Thus, tilt wall qualifies as a technology insofar as it is a system that results in a construct. However, can a building technology convey meaning or contribute to it in so far as architecture aspires to provide an experience or to tell a story? Does it carry cultural import?

If we accept that there are styles of design and styles of building in architecture,¹⁰ tectonics becomes the logical destination for the positioning of tilt wall as a viable modus for design exploration. Frampton offers a compact thesis for his work in *Studies in Tectonic Culture* that captures the sense in which tilt wall might be considered tectonically: “Without wishing to deny the volumetric character of architectural form, this study seeks to mediate and enrich the priority given to space by a reconsideration of the constructional and structural modes which, of necessity, it has to be achieved. Needless to say, I am not alluding to the mere revelation of constructional technique but rather to its expressive potential.”

While I acknowledge Frampton’s rather indiscriminate use of technique rather than technology as posited here, the issue of tilt wall construction’s potential expressivity comports with the notion of tectonics as the combination of structure and construction as a vehicle of intention and meaning. Architecture exists in the entirety of its productive processes. This is not an apology for a return to the nostalgia of craft, structural determinism, or Semperian cladding rhetoric. Rather, it is a call for a more



IMAGENET HOUSTON PHOTO COURTESY ELLIOTT + ASSOCIATES ARCHITECTS; PICKLE ELEMENTARY SCHOOL PHOTO COURTESY TEAMHAAS ARCHITECTS
 K.J. MCINTY PHOTO COURTESY ELLIOTT + ASSOCIATES ARCHITECTS; TNU CUSTOMER SERVICE CENTER PHOTO COURTESY CUNNINGHAM ARCHITECTS



The MNP Corporate Headquarters in Houston, designed by Powers Brown Architecture, utilized tilt-wall construction to achieve a skin that suggests a billowing surface.

tectonic consideration of tilt wall's potential contribution to the integration of what Colin Rowe coined as the "physique and morale" required for meaningful architectural manifestations.

Tilt wall is an untapped source of architectural potential. It needs to be positioned as something other than the route to expedient construction. It has to be seen as a contributor to meaning both as a technology and a culturally significant process. A building that is "clear" or honest in terms of its structure has always been an attractive myth but never the guarantor of anything beyond mere construction. If tilt wall construction is to contribute meaning and thus become a source of more intense research, what it offers has to have a value of acceptable currency. Cheapness is not enough. Beyond economy, it has great flexibility in how it potentially "represents," in how it is positioned and manipulated as a matter of a larger tectonic argument in the scheme of a given solution. That is where the rich territory for exploration lies.

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ENDNOTES

1. These include but are not limited to The Tilt Wall Concrete Association, www.tiltup.com, The Precast Institute
2. *Concrete Construction*, August, 2002 by Maura Johnson
3. www.irvinggill.com - "Aiken Process Used for first Time in San Diego"
4. Recently there has been, due to the sheer ubiquity of the method, some limited engagement of Tilt Wall Construction by notable architects- Steven Holl utilized it once in his Seattle Chapel, Scogin, Elam and Bray employed it on a public library in Atlanta, Rand Elliott and Associates used it to create a well published design for a Tilt Wall Contractors office in Oklahoma, Gary Cunningham Architects have completed a few buildings utilizing Tilt Wall in the Dallas Metroplex- one of which has made the national press and Carlos Jimenez in Houston has also experimented with it in a nationally published project for Cummins Corporation.
5. Sam Mockbee and the Rural Studio explored this relationship.
6. www.tiltup.com - commercial construction articles
7. Common plaster finishing technique in England by my observation
8. OED
9. *ibid*
10. "The Details of Modern Architecture" Edward R. Ford introduction

Powers Brown Architecture maintains a diverse architectural, interior and urban design practice that spans from regional to international projects. Founded in September of 1999, the firm began inquiries into an area of practice it deemed **neglected territory** - project types, construction technologies and design business strategies ignored by both mainstream and vanguard architectural practice. Commissions have been undertaken for projects as diverse as tilt-wall industrial projects, Federal Government Agencies and New Towns in locations such as Cairo, Egypt and Lahore, Pakistan. The work has been approached with a uniquely American balance between Raymond Hood like entrepreneurialism and an enthusiasm for Jim Stirling's eclectic design output. The firm is closely involved with the relationship between architecture / urban design and construction, innovating in delivery methods that allow award winning design to compete with commodity and everyday architectural production on its own terms.

"...In reviewing and studying the works and intentional practice of **Powers Brown Architecture**, an old saying came to mind; "architecture does not have to be for special occasions". Powers Brown knows this and has built a practice working in realms that are most often avoided...In some ways Powers Brown is pioneering a hybrid of critical and commercial practice, striking a balance between the two. It is a young growing firm, moving forward without the prejudice and predetermination that often narrows the field of operation. I expect Joe Powers, Jeffrey Brown and their team will set an example others will eventually follow."

-Michael Rotondi, Los Angeles

Powers Brown Architecture has offices in Houston and Washington DC.