Raising the Dead

BLRB Architects

BY DAN PUTNAM, S.E., P.E.

Long-span office space brings new life—and higher leases—to an urban garage that had fallen out of favor.

STARTING IN THE EARLY 1990s and for nearly a decade, the City of Tacoma, Wash. had contemplated tearing down its twin five-story, 500-stall concrete urban parking garages, built several blocks apart in 1970.

They were referred to by the mayor as the "Two Tombstones" of Tacoma, as they never fulfilled the promise of providing impetus for downtown retail development. They had fallen into disrepair, as the post-tension rods had failed in the exterior concrete spandrels over time, weakening the structures' ability to withstand earthquake motions, and the cost of deferred maintenance mounted. PCS Structural Solutions, a Tacoma/Seattle-based structural engineering firm, had consulted the city with several options for structural repair over the years, yet the garages remained a civic eyesore, and street level retail never materialized.

When the City Council was set to endorse staff recommendation to demolish the garages in 2001, I, as Chairman of PCS, intervened and proposed a substantial redevelopment. Having just sold most of my interest in PCS to next-generation leaders, with the intent of spending more time pursuing real estate development, I asked if PCS would consider a prelease commitment as a catalyst to propose a redevelopment of the south garage. PCS owners agreed to be one of the tenants, occupying roughly 14,000 sq. ft of the 65,000 total sq. ft of office space (the structure also includes 35,000 sq. ft of ground-floor retail space). This allowed me to independently form Pacific Plaza Development and ultimately win the public-private contract with the City of Tacoma.

Higher and Lighter

The existing concrete garage was structured similarly to many standalone garages throughout the country, with perimeter beams and columns, a central bearing wall and 60-ft-span precast concrete framing between. While it had some significant seismic deficiencies (a central concrete core was added to take about 60% of the seismic load for the building and new additions), the majority of the structure was in good repair and had originally been designed for two additional concrete parking levels to be added in the future.

However, PCS's analysis determined that it was feasible to add three levels of structural steel to the existing structure, without cost-prohibitive foundation upgrades. The much lighter dead load of the steel structure and the increased live load reductions for garages per ASCE-7 (compared to the 1970 UBC code) resulted in the ability of the existing concrete base structure to support the one additional level of parking required by the city *and* two added levels of speculative office, along with a green roof system.

PCS chose to use cellular beams for the three steel-framed levels. Doing so allowed for a green roof to become part of the project; the cellular beam system weighed about 25% less than a conventional beam system, thus "freeing up" load and making the extra soil weight of a green roof acceptable. The attributes of the green roof significantly contributed to Pacific Plaza receiving LEED Platinum certification from USGBC and winning state and national awards for sustainable design.

While a number of 60-ft-span cellular beam parking structures had been constructed, the longest known conventionally framed


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▲ Pacific Plaza, completed.

◀ One of two concrete garages, known as the "Tombstones of Tacoma," before being transformed into Pacific Plaza.

▶ Framing at PCS's office in Pacific Plaza.


PCS Structural Solutions

cellular beam span for an office at that time was the Banner Bank Building in Boise, which used 45-ft spans (see "Banking on Sustainability, 07/2007). PCS evaluated applications of CMC's SmartBeam product in order to provide the 60-ft clear span framing. A number of vibration studies were conducted with different degrees of damping to determine the best combination of beam size, spacing, metal decking and slab thickness. (Analysis and theoretical results of an unproven span took on a life of its own, as PCS would be occupying the space it designed, and perceptible vibration would not have been an endorsement of the firm's engineering prowess.) Pacific Plaza is the first office project to use 60-ft cellular beam spans with 50 psf live load floor loading.

The resulting office floor system consisted of 36-in.-deep cellular SmartBeams at 10 ft on center with 2-in. 18-gage type W metal deck and a total slab thickness of 5½ in. The parking floor used a similar system with 3-in. 20-gage type W metal deck with a 6½-in. total slab thickness. SmartBeams were flush-framed at the perimeter with 50-ft-span, 36-in.-deep conventional steel beam girders to match the column spacing of the garage below. So far, performance has been excellent, with minimal perception of vibration.

PCS also wanted to create an office atmosphere that expressed their structural design ingenuity, and the exposed SmartBeams, with intumescent paint fireproofing, anchor

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the structural showcase along with the conference room and training amphitheater.

Recession-proof?

Not only has this approach resulted in an attractive, high-performance building, it may have also revealed a potential economic advantage. While the cost of using a 60-ft structural steel grid for the office floor structure created a $4 to $5 premium on a square-footage basis (less than 2% of the core and shell cost), as compared to a conventional 30-ft by 30-ft grid (due to the increased weight), it resulted in leasing efficiencies that very well may have saved the development from the recession.

Here's how: In a down economy with limited tenants, a large potential tenant issued an RFP requesting 39,000 sq. ft of office space. Their existing space was 36,000 sq. ft on five floors a few blocks away, and they needed more room. Pacific Plaza provided a space plan using large, column-free floor plates to demonstrate that the potential tenant could fit their entire program and growth projections into two floors—in only 34,000 sq. ft. Pacific Plaza went on to gain the tenant at higher lease rates per sq. ft than competing properties because of efficiency of the column-free environment.

This begs the question, should this long-span, column-free grid be considered for conventional ground-up office buildings? It may be difficult for a developer to swallow $4 or $5 per sq. ft more in structural costs and having to prove spatial efficiency to potential tenants in order to demonstrate a return on investment. We had the perfect storm of a tenant with limited options that wanted to be in a LEED Platinum building. They were impressed with the space plan prediction, and as such Pacific Plaza won the lease and delivered what they needed, with space to spare.


Lara Swimmer

▼ Erecting the 60-ft CMC SmartBeams.

PCS's finished space showcases exposed cellular structural steel framing in the conference room and amphitheater areas.

With that said, there may be similar parking garages—with long, column-free spans—that have capacity for vertical expansion, adding offices on top of existing garages, with great views and convenient covered parking. Tacoma's other twin "Tombstone" is certainly a candidate, though there are currently no plans to move forward with such a plan.

Regardless, the result of this tombstone transformation, which opened in 2009 and was completely full by late last year, is a successful public-private development with more than 100,000 sq. ft of speculative office and retail space that is 100% occupied. The tipping point was the efficiency of the unconventional structural grid and structural steel solution, which created an advantage in competing for tenants. Given the right circumstances, there may be significant opportunities for long-span speculative office buildings in the future. MSC

Owner
Pacific Plaza Development
City of Tacoma

Architect
BLRB Architects, Tacoma, Wash.

Structural Engineer
PCS Structural Solutions, Seattle and Tacoma, Wash.

General Contractor
Absher Construction Company,
Puyallup, Wash.

Steel Team

Steel Fabricator (SmartBeams)
CMC Steel Products, Hope, Ark.
(AISC Member/AISC Certified Fabricator)

Steel Detailer
R.F. Stearns Inc., Lake Oswego, Ore.
(AISC Member)