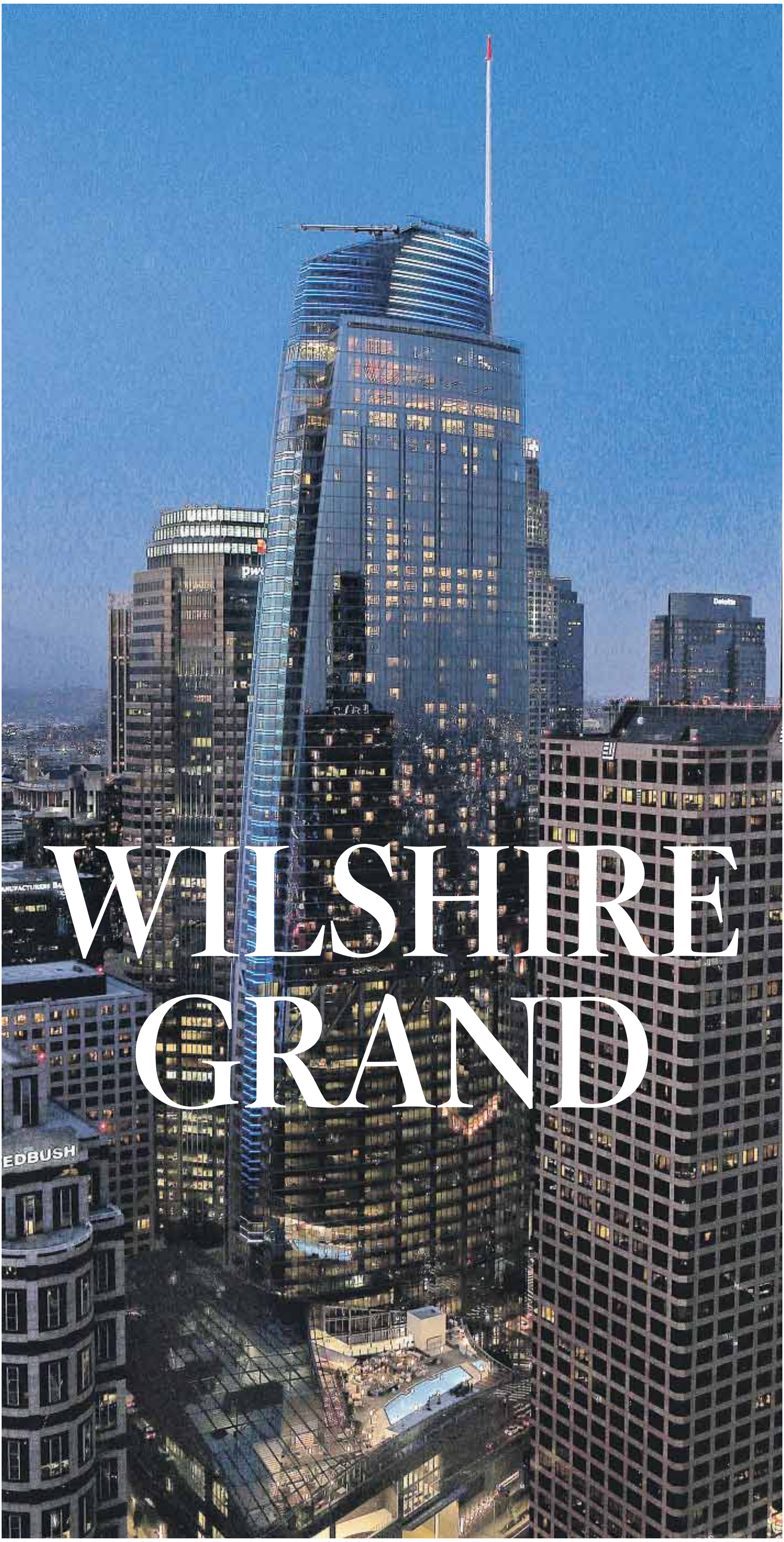
WILSHIRE GRAND



HIGH EXPECTATIONS
L.A. now has a new tallest building. How will it fit into the fabric of the city? **PAGE 2**

FINISHING TOUCHES
In the design of the tower's interior, any detail out of place could spoil the effect. **PAGE 6**

A RIVER OF GLASS
How the project's signature skylight, inspired by the Yosemite Valley, was saved. **PAGE 18**

SEISMICALLY CHIC
One of the tallest buildings in an earthquake hot zone had to balance safety and style. **PAGE 20**

MEL MELCON Los Angeles Times

WILSHIRE GRAND

HOW WILL L.A.'S NEWEST HIGH-RISE FIT INTO AN EVOLVING CITY?

By Thomas Curwen

Standing at the base of the Wilshire Grand, architect David Martin shielded his eyes to take in the scope of Los Angeles' newest and tallest skyscraper.

Eight years ago, this shimmering glass tower began its life in his sketchbook as an ink drawing and a splash of blue wash. Now, after four years of construction and $1.35 billion, it is debuting on the city's stage. Guests have begun to arrive; tenants come later in the year.

The prospect leaves Martin a little nervous. The expectations for this building are high.

For all its 21st century detailing, the Wilshire Grand is a throwback to a time when Los Angeles dared to dream tall and for three decades — the early '60s to the early '90s — saw a fledgling skyline emerge above Bunker Hill, Century City and Westwood.

But such aspirations can be fickle. That boom, financed in part by Japanese capital, stalled amid an economic recession. Now 30 years later, this new tower rides a new wave of development rippling through downtown and outlying communities such as Hollywood and mid-Wilshire.

Driven by Chinese and Korean investors, this prosperity reflects not only a shift in the world economic order but also a renewed faith in Los Angeles' potential on the edge of the Pacific Rim. (In 2015, South Korea was Los Angeles' No. 3 trading partner, with two-way trade totaling $23.7 billion.)

When Korean Air, owner of the Wilshire Grand, lighted the building's crown with the red, blue and white swirl of its logo, it captured that historical sweep. The airline's chairman, Yang Ho Cho, first visited downtown Los Angeles on his honeymoon in 1974 and was told to be careful if he went out after dark.

Today he expresses the hope that this building will be an icon for the city as well as a symbol of pride for its Korean community.

But on a late May afternoon, Martin wasn't taking a global perspective. Wandering out onto the pool deck overlooking 7th Street, his concerns were more immediate. The amplified strains of a violinist drifted from a distant sidewalk.

The Wilshire Grand has represented for him a lifetime opportunity to build a downtown landmark, much as his grandfather did with City Hall and his father with such high-rises as the Department of Water and Power and the Arco Towers.

He spoke of the building's parametric sloping, its reflectivity, the alignments between the indoor and outdoor spaces and the overhead "bones," the seismic supports — and he anticipated the critics.

What does the Wilshire Grand offer the city, they will ask. Is it for the wealthy and privileged? Does it advance the science of engineering or a theory of architecture?

"I hope they all like the building," he said.

Every tall building is a unique performance, a blend of grand effects and minute detail. Some strike a single note. Others try for a deeper, almost symphonic complexity.

The gesture might be old-fashioned, reminiscent of the early decades of the 20th century, a statement that speaks more to the egos of a few than the needs of the many.

But this is what cities do, no matter the expense or impracticality. From a distance, these structures declare their prowess and modernity by lifting themselves above the horizon like Oz, proxies in glass for ambition and power. From the sidewalk, they inspire passers-by to peer skyward, a remarkable feat when daily occupations compel many to look only ahead.

And in Los Angeles — not New York, not Chicago — the raising of these buildings is all the more remarkable in a region where downtown is a mere island in a vast suburban sea.

Conceived during the height of the recession as two towers — one a hotel and one an office — the Wilshire Grand eventually was consolidated into one, driving the height to 73 stories.

Given its complexity, architect Michael Maltzan, whose projects include the apartment complex One Santa Fe and the new 6th Street Bridge, wants to wait before passing judgment.

"The ability to measure its impact is complicated by time," he said. "A tower, a building of that scale, functions at so many different scales, each of which is measured in different time frames, so it is hard to say from Day One if it is a success or not."

He cited a few object lessons: The Eiffel Tower and San Francisco's Transamerica Pyramid were mocked at their debuts and today are beloved icons. The U.S. Bank Tower, completed in 1989 a few blocks away from the Wilshire Grand, also received mixed reviews. One critic overlooked the design of what was then the city's tallest structure, focusing instead on its "dizzying, seven-year exercise in deal-making."

Some question whether the Wilshire Grand deserves iconic status. Its claim over the U.S. Bank Tower, they say, is a cheat, based on a spire that gives it an 82-foot advantage.

And if spires count, they add, then what about a 1,215-foot smelter smokestack in Magna, Utah?

Yet part-building, part-spire, the Wilshire Grand already has shifted Los Angeles' conception of what its skyline can be — no longer the flat-topped relics of an era that privileged helipads over ornamentation.

For architect Eric Owen Moss, however, any discussion of merit based on height is antiquated. Moss, former director of the Southern California Institute of Architecture, recently designed a 17-story tower near the La Cienega-Jefferson light rail station.

"I'm sure it matters to the developer, but I'm not sure if it matters to the city or to the community downtown at all," he said.

More interesting to Moss is whether or not the Wilshire Grand offers a new understanding of what a tower can be. He wondered how the building will interact with the street or if it will advance a new conception of the city.

"You get to be the biggest building if you demonstrate you have the biggest or most substantial content," he said.

A 60-second ride in a service elevator took Martin to the top floors.

Others may peer at the city, which from this perspective seems oddly miniaturized.

But as he stepped onto the terrace on the 73rd floor, Martin turned to study the steel-and-glass sail — a technical achievement rising an additional 300 feet above him.

A skyscraper, Martin said, is often boring: a big box designed for utilitarian, commercial purposes with design subservient to the cost and speed of construction.

Pushing against those pressures is part of the architect's job.

And Martin counts the sail and the adjoining spire as one of his successes, an elaborate and costly artifice, a hood ornament by any other name.

As he climbed the stairs into the sail — which will be closed to the public — he was surrounded by wide-flange beams, up to 44-feet in length, crisscrossing around him like a cat's cradle.

"It's like a ship," he said, proud that this element withstood the months of debates and disagreement.

But he knows that even monumental design is never fixed in time.

Just blocks away is the City National Plaza, with its twin towers.

Designed in the 1960s by Martin's father, Albert C. Martin, these 52-story buildings — the Arco Towers — have long been honored as a model of Corporate-International style, austere in their smoked glass, dignified in their identical pairing.

Yet last year the owners modified the top story of the north tower, changing the color of the glass, adding a ribbon of silver-white around it.

Spoiling the symmetry.

As the afternoon waned, traffic on the 10 Freeway was a ribbon of cars, creeping in and out of downtown, bumper to bumper.

For all the best intentions and design, the future of the Wilshire Grand is linked to the city.

Sprawl — awesome by day and sparkling at night — is one thing, but gridlock, no matter the hour, is another.

For Thom Mayne, one of the city's preeminent architects, the success of the Wilshire Grand depends on how the city rises up to meet it.

Looking at the future, Mayne, the executive director of the UCLA Now Institute, believes that Los Angeles' greatest challenge is an anticipated population increase of 1.5 million by 2050.

He argues for the increased densification of the Wilshire Corridor, 15 miles from downtown to Santa Monica, soon accessible by subway.

To this end the Wilshire Grand, he said, is "useful," but he added, "it is one single building.

"What's important is for it to be followed by housing."

Without that step, the skyscraper "is just another random building with no broader connectivity, no synergy, no relationship to some broader strategy of how the city is going to grow and what that means to its citizens — again on human terms, on social terms, on cultural terms."

The city of Los Angeles, he said, must take the next step.

thomas.curwen@latimes.com

LUIS SINCO Los Angeles Times

WILSHIRE GRAND THE RISE OF A NEW SKYLINE

EMBRACING L.A.

The project grew from a handshake to become the tallest building west of the Mississippi. For three years, Times staff writer Thomas Curwen has chronicled its construction, from the initial planning phase to the topping off and final design touches. On the following pages are his stories of the Wilshire Grand tower.

Architect Chris King isn't entirely sure when Reyner Banham clicked, but the English critic's theories about Los Angeles came to him at just the right time.

Long before demolition crews moved in on the squat and aged hotel that had occupied the corner of Figueroa Street and Wilshire Boulevard, the 41-year-old architect with A.C. Martin Partners tried to imagine what the interior of the new skyscraper — the Wilshire Grand — might look like.

The canvas was huge, more than 2 million square feet, fitting for the city's tallest building, a combination of hotel and offices, public and private space.

King and the design team at A.C. Martin had been brainstorming a variety of concepts that would complement the architecture — its indoor-outdoor spaces, its seismic supports, its vantage upon the city — and they needed to strike a look that would mirror Los Angeles' identity.

Early on they had misjudged, developing a furniture scheme styled after the distinctive Korean roof tiles, *giwa*. They felt it would appeal to the building's owner, Yang Ho Cho, the chairman of Hanjin International Corp. and Korean Air.

But Cho and his daughter Heather, who had taken a lead in the project, didn't want the building to reflect Korean culture. Instead, they insisted that it capture Los Angeles' essential qualities.

What is the big idea, they pressed King.

Accustomed to clients asking about color schemes and materials, King realized that he needed to think larger and more conceptual. The *giwa* furniture style was too small.

Taking to the street, he studied the building site from neighboring buildings, and as the concrete core began to rise, he took the construction elevator to the top floors, where Los Angeles emerged from the rose of the compass: to the west, the swirl of the 10 and the 110 freeways; to the south, the linear grid of subdivisions stretching to San Pedro; to the east, the downtown skyline, and to the north, the San Gabriel Mountains.

King realized then that Banham still had it right. Each angle corresponded to the four ecologies: Surfurbia, Foothills, The Plains of Id, Autopia. Each would inform to the interior design of the city's newest building.

On a recent spring twilight, King was out on a rare evening run in Echo Park. Banham was far from his mind when he caught a glimpse of the Wilshire Grand lit up as it had never been before.

In a riot of color, a vertical band of light — blue fading to yellow like the colors of a sunset — played along the building's spine, and as the image lit up Instagram and as technicians fine-tuned the LEDs from inside the tower, King felt a kick of adrenaline.

Four years of construction were coming to an end, nearly 10 years conceiving, planning and drawing, and with hotel guests arriving within weeks, he knew that time was running out.

The punch list — construction-speak for all the details needing to be completed or repaired — had 35,000 items on it, and King was soon back on site, stepping through a clutter of scaffolding and cardboard boxes, overflowing dumpsters and pallets of building material that filled the rooms and hallways.

The nature of his job requires that after imagining, drawing and negotiating the high concepts, he bats clean-up, making sure all the details are in place. Perfection seemed elusive as he toured the 70th floor with senior production coordinator, Grit Leipert.

A coating of dust clouded the light fixtures hanging in the lobby. A gash marred the parquet angling across the restaurant floor, and a door in the men's room fell well short of its jamb.

They made notes and took pictures.

No detail, King said, can ever be too small or fix too minor when delivering a $1.35-billion skyscraper.

Simply put, he said, "you don't sell a new BMW with a broken headlight."

Once King understood the role that Banham could play in the design, he and his team turned to the 70th floor — the hotel's lobby — where guests check in, the city surrounding them.

The space, King realized, could be "a synopsis of the entire narrative" and he set about linking the interior to the city, matching details with whatever ecology was immediately in view.

If they got it right, they felt the rest of the design would fall into place.

"We're trying to choreograph a set of experiences for visitors to the building," said King. "I don't know if I'd call it subliminal, but we are trying to evoke a mood and a feeling."

Through months of debate and discussion, hours of presentations in Los Angeles and Seoul, they fine-tuned the shapes and form, colors and texture. They consulted with artists, researched materials and dug deep into their collective sensibilities to come up with what they hoped would be a coherent plan.

The stakes may not be as critical as the fire elevators or seismic supports or as sensational as the exterior lighting, but King knew that anything out of place could ruin the desired effect.

They designed a chandelier the color of automotive lights, red, white and amber, hanging from the ceiling above the check-in desk in a pattern based on a schematic of the 10 and 110 freeway intersections. The carpet and furniture in the adjacent lounge feature angular patterns replicating the city's suburban grid.

The club space, facing the mountains, is decorated with pictures of the foothills. The carpet and furniture patterns mimic the lines of a topographic map.

And in lieu of the beaches — too hard to see from this distance — they added a fifth ecology, downtown, in acknowledgment of its renaissance, so that the bar with its view of the neighboring buildings has a photo mural of the Studebaker dealership that once stood on this corner and a neon sign capturing the city street name mnemonic:

From Main we Spring to Broadway, and over the Hill to Olive. O, wouldn't it be Grand if we could Hope to pick a Flower on Figueroa?

As they developed the concept beyond the 70th floor, the complexity multiplied. The size of the project was daunting: Some components — the plaza, the restaurant, the health club — were as large as previous jobs.

They championed the improbable, a mash-up in the steakhouse of 18th century Versailles with 19th century California rancho décor, and fashioned the whimsical: the pool deck with its foam stools, buoy lights and the No Dive Bar.

"It felt like we were working on 25 Swiss watches at once," King said.

By late afternoon, he stood outside the lobby on the ground floor. King stepped among the extension cords, saws, sanders, man-lifts, pavers, drop cloths and bubble-wrapped bollards.

Along a broad band of concrete above the entrance to the parking garage, contractors had applied blue masking tape and a vinyl template, the start of a mural.

This space in the porte-cochere had always been a challenge for King, a blank canvas that done right could set the tone for arriving guests. But he didn't want it to compete with one of the project's most-significant commissions.

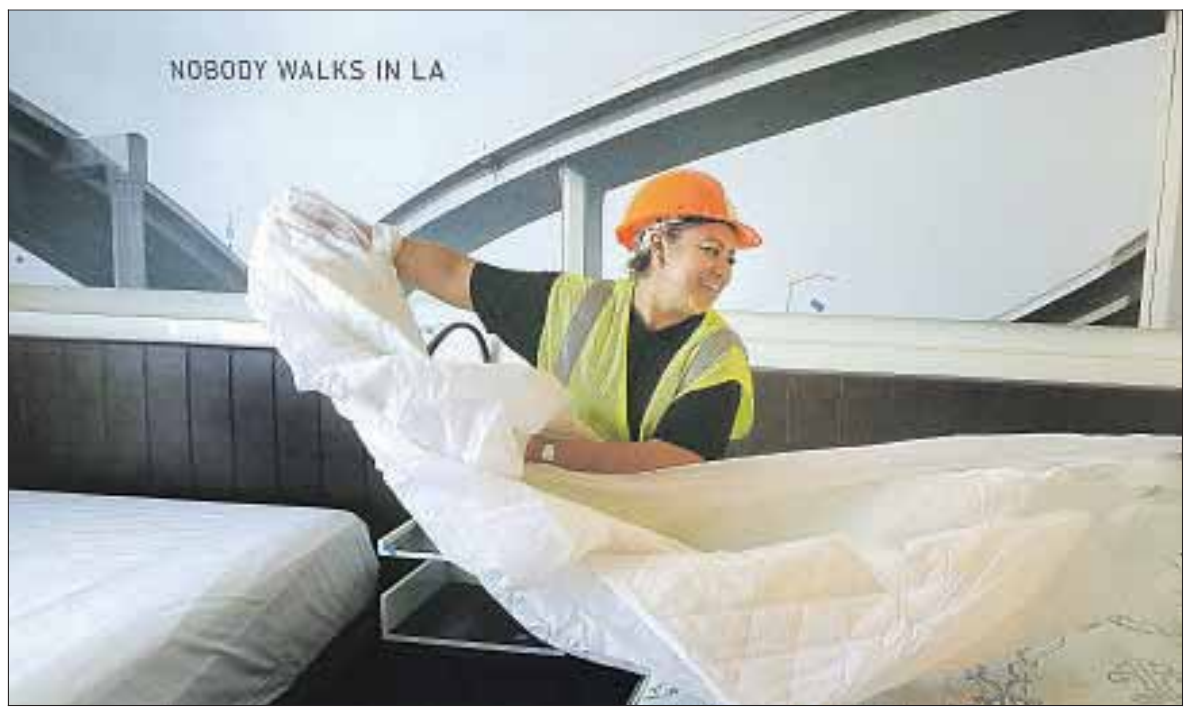
Through the windows of the lobby, a sculpture designed by the Korean artist Do Ho Suh dominates the space, a three-story-high wash of colors, blending like a snow cone from red to yellow to green to blue. Up close, the pattern reveals itself to be nearly 86,000 figurines — each a few inches tall — rising atop one another, hands to feet: a high-concept homage to pluralism.

The mural, by contrast, had to be less flashy.

Borrowing from Ed Ruscha's linear documentation of the Sunset Strip, King developed a pastiche of Los Angeles' suburban skyline in silhouette: street lamps, billboards, palm trees and a few icons, Randy's Donuts, the Watts Towers.

"I have always found the skyscape of Los Angeles not banal or unsightly," he said. "It sets the tone for the city."

He now just needed to decide which shade of gray — and there were six to choose from — would best capture this distinct ecology.



HORTENCIA ESPARZA helps make a bed inside a guest room of the InterContinental.

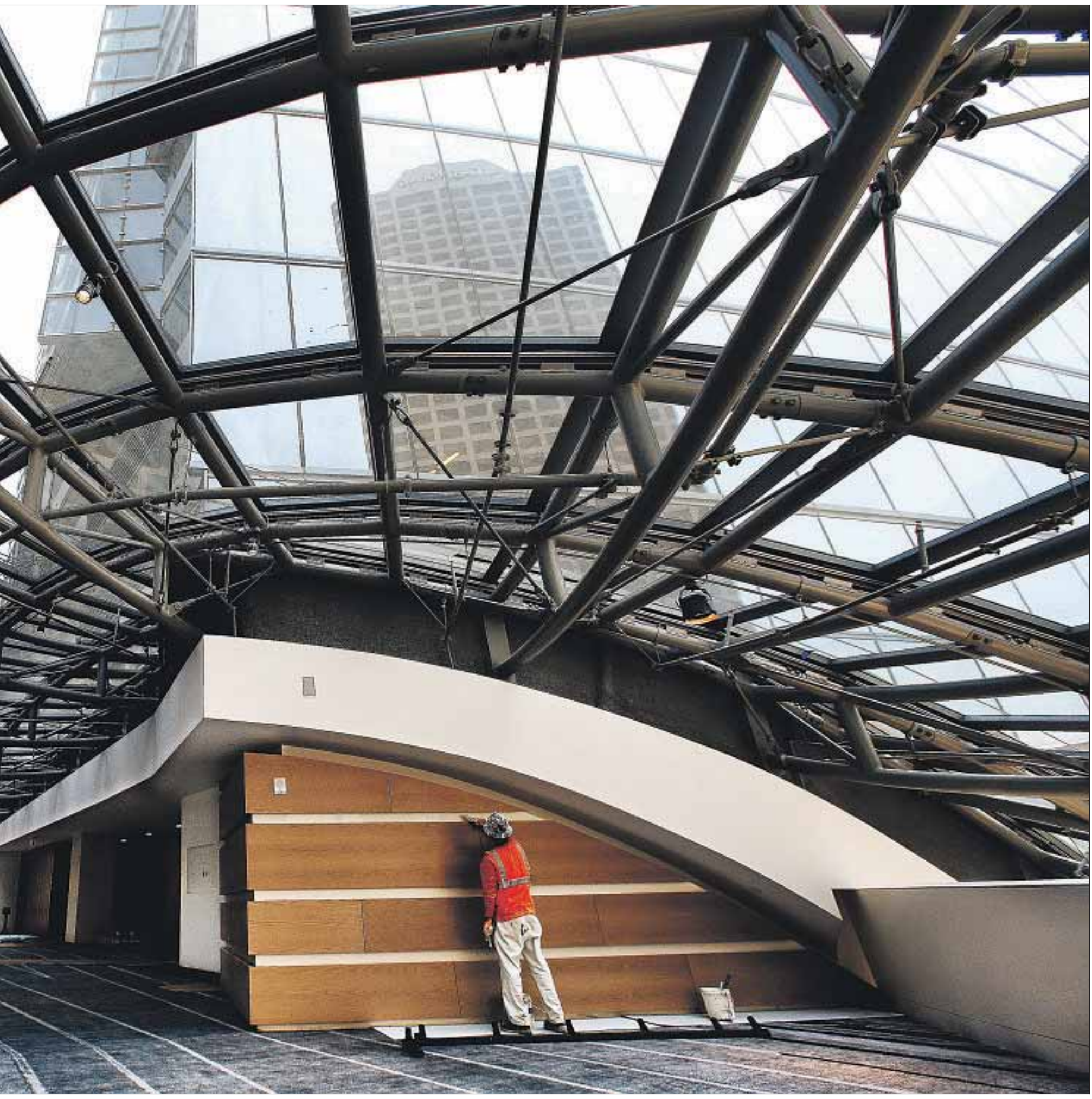
FINAL TOUCHES are made on the main path for hotel guests to get from the tower to the pool deck,

ARTISTS FINISH the splashy mural that adorns the pool area of the InterContinental Hotal.

INSIDE AND OUT

A LAST-MINUTE steam cleaning for the porte cochere at the Wilshire Grand.

SCAFFOLDING is erected to install louvers and a three-story-high chandelier.



Photographs by MEL MELCON Los Angeles Times

which features foam stools, buoy lights and the No Dive Bar. "We're trying to choreograph a set of experiences for visitors to the building," says architect Chris King.

A WATER FOUNTAIN greets visitors in front of the Wilshire Grand Center.

A MARBLE countertop is installed in the master bath of the Presidential Suite.

WILSHIRE GRAND THE RISE OF A NEW SKYLINE

GEOLOGIST Rosalind Munro descended eight stories deep to verify the stability of the building site prior to construction.

YANG HO CHO, Korean Air chairman, and daughter Heather, executive vice president, at company headquarters in Seoul.

"WHEN WE went to one tower, all the pieces fell into place," says David Martin, co-chairman of A.C. Martin Partners.

CONSTRUCTION WORKERS guide a jumping wall form system into place as it is lowered into posi-

GROUNDWORK PLUS

Eventually all the pieces fell into place. But before the project could get off the ground, someone had to make sure that the ground was solid.

CHRIS MARTIN'S family had shaped the city's skyline. With this project, they hoped to redefine and re-energize it.

"OK. On down."

Geologist Rosalind Munro spoke into her walkie-talkie. The cage she was standing in shuddered and slowly dropped farther into a shoulder-width borehole drilled beneath the streets of Los Angeles.

Munro was heading eight stories down to assess the stability of a building site. She needed to know whether the soil would support a skyscraper that would be the tallest west of Chicago and one of the tallest in the world on such seismically sensitive ground.

Looking up past strata hundreds of thousands of years old, she saw the sliver of sky grow smaller than a fingernail.

"Stop."

The cage jerked still, darkness above and darkness below.

A cave-in would bury her in seconds, but the scientist put the thought out of her mind.

She reached for her pick and focused on finding answers for the engineers above ground — and for the two men whose handshake a decade ago had inspired the ambition to build the Wilshire Grand.

For nearly nine decades, members of the California Club downtown have gazed upon this city's evolving skyline from Flower Street.

Los Angeles' first skyscraper, completed in 1904, stood 175 feet tall and was a few blocks east at 4th and Spring streets. The city later imposed height limits on its buildings, and for 40 years City Hall, rising 454 feet, was the most conspicuous exception.

In the summer of 2014, the honor of being the tallest building belonged to the U.S. Bank Tower — an imposing fireplug that looms over the California Club, where on a summer evening in 2004 Chris Martin and Yang Ho Cho met for the first time over dinner on the outdoor terrace.

Their introduction had been arranged by Max Nikias, now president of USC but then the dean of the School of Engineering. He wanted Martin, an architect and USC alumnus, to meet the South Korean businessman, a fellow Trojan.

With the city lighting up around them, they talked about their work. The Martin family helped design City Hall, and in succeeding decades had shaped the city's skyline. Martin and his cousin, David Martin, were the third generation to run A.C. Martin Partners.

Cho, 65, oversaw his family's business, which began as a freight company after World War II. Over the decades, Cho and his father developed Hanjin International Corp. into a multi-billion-dollar empire with assets that included Korean Air Lines.

The friendship between Martin and Cho grew easily. They shared a love of airplanes, and they spoke about the challenges of guiding their children into their businesses. Over time, they visited each other's ranches, one on an island off the coast of Korea, the other just outside of Yosemite National Park.

Five years after their first meeting, Cho dropped in on his friend. On a Friday afternoon in 2009, they sat in Martin's corner office overlooking 5th and Flower streets. Martin got his guest a Coke.

"I own this hotel down the street," Martin recalls Cho saying. "Everyone tells me not to pour any more money into it."

Cho's company had acquired the Wilshire Grand from Hilton Hotels Corp. in 1989 for $168 million. He had taken steps over the years to improve the property at the corner of Wilshire Boulevard and 7th Street, but wasn't satisfied.

"I've spent $40 million trying to turn this into a four-star hotel, and I think I've gotten only four one-star hotels," he told associates.

Perhaps A.C. Martin could help.

Martin's staff assembled six scenarios. Five laid out modifications to the hotel. The sixth argued for demolition and construction of a hotel and an office building in two separate towers.

"That's what I want to do," Cho said.

A previous study Cho commissioned had recommended against demolition, but he didn't agree. He believed a new development would symbolize his company's commitment to Los Angeles, and he believed that in spite of the recession, it was the time to make that statement.

Cho had another request as well, one that offered the Martins an opportunity they had never thought they would see. Cho wanted his friend's company to take charge of the design for the 2.7-acre site.

New high-rises are rare in Los Angeles, and when they do come along, the competition among architects is fierce.

The Martins knew they weren't starchitects like Frank Gehry. Their company had a sterling reputation in Southern California but little visibility outside the region. Designing the tallest skyscraper in the West, a building both structurally sophisticated and beautiful, could change that.

But they knew there were no guarantees. Cho had been loyal, but loyalty can be fickle, especially on a high-stakes project like this, budgeted at $1 billion.

Martin remembered a commission in Jakarta that his firm lost to I.M. Pei when the wife of the owner ran into the acclaimed architect at a cocktail party. Martin knew it was not uncommon for other architects to horn in on big projects once the city permits were secured.

Until the city approved the Wilshire Grand and Cho greenlighted the concept, the Martins wouldn't feel secure.

So they worked fast. The project manager, Thomas Properties Group, began negotiating city approvals, and David Martin began detailing the site with a plaza and a 45-story hotel with condominiums and a 65-story office building with

Photographs by MEL MELCON Los Angeles Times

tion by a crane into the core of the Wilshire Grand tower in downtown Los Angeles.

TEAMWORK

1.5 million square feet of space.

The City Council approved the project in March 2011, and everything seemed to be falling into place.

Then the unforeseen happened. The two towers no longer penciled out.

The market for office space had collapsed.

If a skyscraper is raised on the speculation that businesses will support it, then hope is raised on its aesthetic allure. The equation is a delicate one, and in Los Angeles in recent years, neither had balanced out.

"Following the stock market crash of '87, we thought that was it for Los Angeles," David Martin said. By the time the economy rebounded in the early '90s, businesses were shifting away from traditional office space toward more mobile work forces, he said.

"No more big buildings."

Cho hoped to reverse that trend, and early estimates had supported his gamble.

The footprint of the project, including the height of the towers, had been calculated so that the value of each floor, based on use, would pay the cost of construction.

But by 2011, that calculation had soured. The demand for downtown office space plunged during the recession, recalled Ayalushim Getachew, who worked for Thomas Properties in managing the project.

With vacancy rates climbing to 19%, tall buildings were emptying out.

Bringing 1.5 million square feet of new office space on the market suddenly made no sense. Cho's advisers searched for new ideas.

They wondered if they could develop the project in phases: first the hotel, and then the office tower when conditions improved.

But that idea introduced problems. Would guests want to stay at the hotel once construction started on the adjoining office tower?

Other suggestions followed: Could they swap the towers, putting the hotel and condos in the taller one? Or could both buildings become hotels, one more upscale than the other?

Cho's team ran hundreds of financial projections. None added up.

Looking for answers, Cho began to doubt Thomas Properties' role in managing the project.

During interviews for the job, Jim Thomas had shown a bold vision that set him apart from other candidates, whose presentations frustrated Cho because they lacked specifics.

"These people have traveled halfway around the world to hear your ideas," Martin recalled Cho telling one candidate. "Tell us about the project, or I'll throw you out of the room."

Thomas, whom Martin had known for 25 years, recommended demolishing the old hotel, and Cho hired him immediately.

But two years later, Thomas Properties seemed "stuck in office buildings, and there was never any progress," Cho recalled.

Cho asked Martin to take over management of the project.

No, Martin recalled saying. "That's what Jim Thomas is for."

The impasse over the design broke when Cho's daughter, an executive vice president with the family's company, presented a new idea.

A graduate of Cornell University's School of Hotel Administration and USC's Marshall School of Business, Heather Cho managed

operations of the hotels owned by Korean Air.

She had had reservations about building an office tower.

"We are a hotel and hospitality company and should rely more on our core values and expertise," she said.

No one Heather Cho spoke to could justify adding so much office space. She proposed combining the two towers into a single taller one with much less room for offices.

Her father swiftly signed on, but he remained adamant about replacing Thomas Properties.

Martin finally agreed to take over and broke the news to Thomas, who according to Getachew felt betrayed.

Thomas declined to comment for this story.

On April 19, 2012, David Martin unveiled the design for a 73-story building with 900 hotel rooms and 400,000 square feet of office space, nearly a quarter of the original amount.

"When we went to one tower, all the pieces fell into place," he said.

All but one. Martin and the engineers didn't have enough information about the stability of the building site that was to support the massive structure.

In the borehole, Rosalind Munro rotated the cage, her headlamp illuminating the closed-in walls. Down there, the musty air was tinged with the smell of petroleum and hydrogen sulfide, the odor of rotten eggs.

She hacked at the rock with her pick, careful not to trigger a cave-in, and uncovered a seashell, a fragment of calcium carbonate nearly 4 million years old, encased in stone. She was looking for soil the consistency of Play-Doh, or for sediment that had changed color. Each would signal a weak bed for the foundation.

At the bottom of the hole, she suddenly heard the alarm. Oxygen levels had been falling as the sedimentary rock absorbed the element. She had completed her research. It was time to get out.

"Bring me up."

The cage jerked in its ascent.

She passed the layer of sand, silt and gravel deposited from the streams and rivers that had poured off the San Gabriel Mountains 100,000 years ago.

She passed the layer of fill, dirt packed with wood fragments, brick and concrete hauled here more recently.

It could date to 1873, when Samuel Calvert Foy built a home thought to be the first three-story building in the city. Or maybe it went back to the days of the Studebaker dealership built after the Foy mansion was moved. Or perhaps it had been shoveled here in 1950 after the Paul G. Hoffman Studebaker agency was leveled to make room for the new hotel.

Munro's couldn't guess. Her findings confirmed what her employer, the geotechnical consulting firm AMEC, had learned from previous tests.

Set upon bedrock known as the Fernando Formation, the Wilshire Grand was going to have as perfect a base in the Los Angeles basin as any engineer could hope for.

Compressed by an ocean that once lay on top of it, the siltstone could be clawed, scraped and shaped for any foundation.

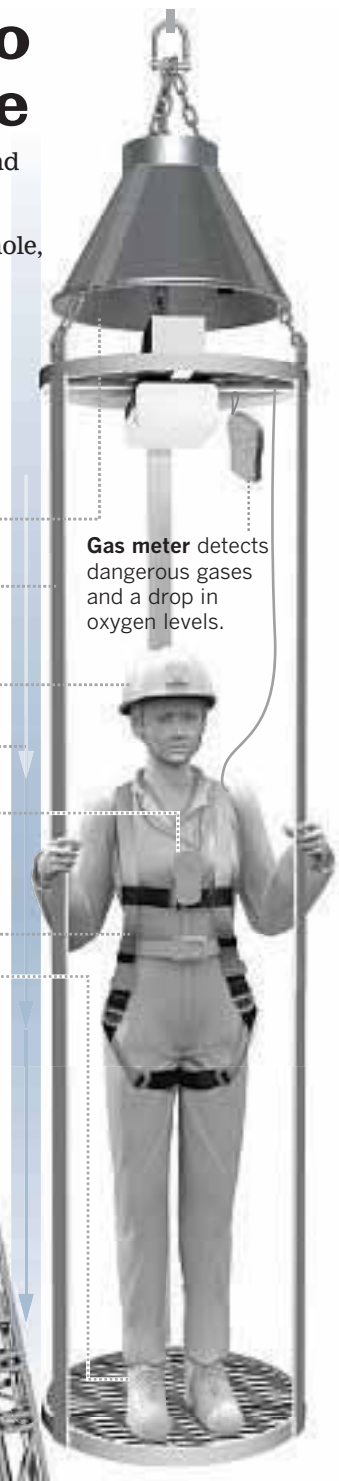
As the cage rose out of the hole, the drilling crew swings it to a side and lowers it to the ground.

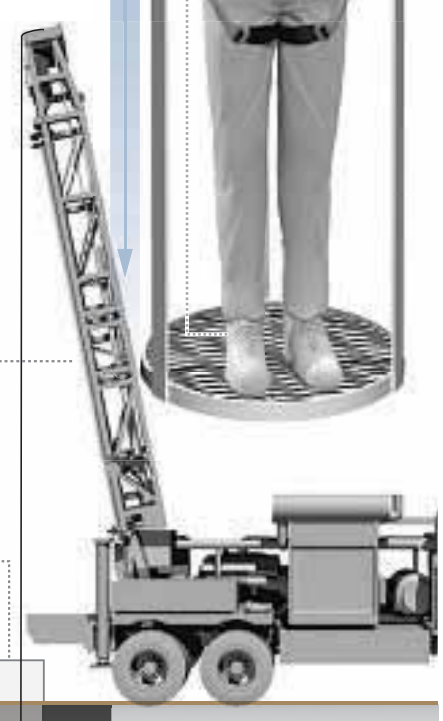
Face streaked with dirt, Munro stepped into the sunlight, its rays catching the tarped relic of the old hotel slowly being torn down.

Descent into the borehole

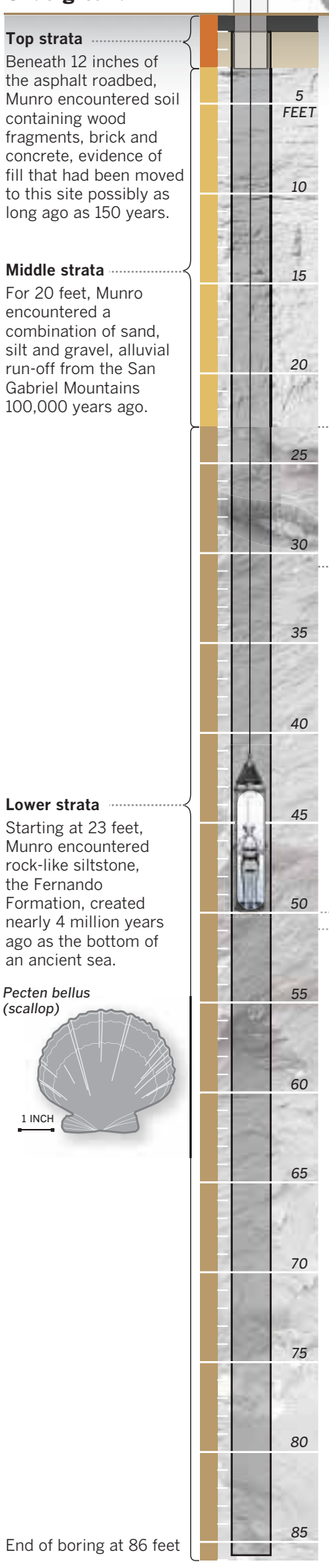
On Feb. 23, 2013, geologist Rosalind Munro with the geotechnical firm AMEC stepped inside an open-air cage and was lowered into a borehole, 86-feet deep, at the corner of Wilshire Boulevard and Francisco Street. She conducted a visual inspection of the soil that was excavated to support the Wilshire Grand.

Special equipment





Underground



Discoveries

The alluvium is mostly sand. Smaller than gravel, larger than silt, it is comprised of fragments of quartz and feldspar from the igneous rocks of the San Gabriel Mountains that were deposited here by the Los Angeles River 100,000 years ago.

The air smells musty, tinged slightly with the odor of petroleum and hydrogen sulfide, like the smell of rotten eggs.

She reported a seepage, possibly from local irrigation or a tree trough on sidewalk.


Scattered shells and shell fragments

At 50 feet, she unearthed a fragment of a seashell, a small swirl of calcium carbonate encased in stone.

At 51 feet, she found a tie-back, a steel rod that had been driven through the soil to support the excavation for the building across the street.

In the siltstone, she discovered numerous layers of concretions, rock formed millions of years ago by the interaction of silt and water and calcium carbonate.

Working with her pick, she freed a number of nodules, golf ball-sized concretions encased in the siltstone and often formed around shells.

With the cage resting on the bottom of the borehole, Munro finished examining the siltstone just before the alarm on the gas meter sounded. The siltstone, unexposed to air for millions of years, was drawing the oxygen out of the hole. She needed to get out.

(Soil textures are not to scale)

Sources: AMEC, Shoring Plan, Cefali & Associates, California Academy of Sciences
Graphics reporting by THOMAS CURWEN

LORENA ELEBEE, JAVIER ZARRACINA Los Angeles Times

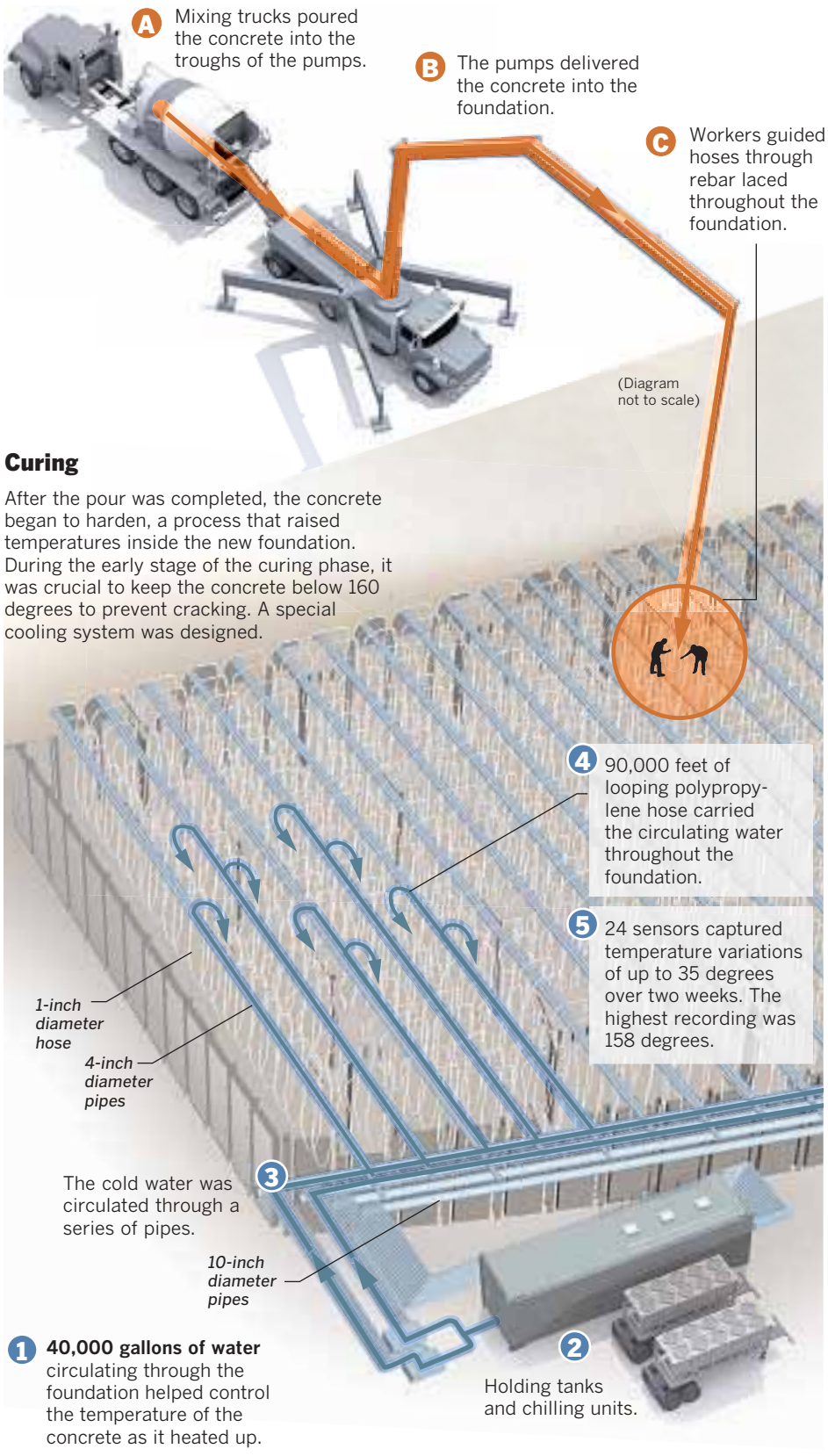
WILSHIRE GRAND THE RISE OF A NEW SKYLINE

The footprint of a giant

The Wilshire Grand is the tallest structure in Los Angeles. On the weekend of Feb. 15, 2014, construction crews, led by Turner Construction Co., laid the concrete foundation for the building that transformed the skyline of Los Angeles.

Pouring

Nothing on this scale had been recorded since 1999, when the foundation of the Venetian in Las Vegas was poured. The success of the Grand Pour put the Wilshire Grand in the Guinness Book of Records for the largest continuous concrete pour.



Curing

After the pour was completed, the concrete began to harden, a process that raised temperatures inside the new foundation. During the early stage of the curing phase, it was crucial to keep the concrete below 160 degrees to prevent cracking. A special cooling system was designed.

The Wilshire Grand

The hotel and office complex include:

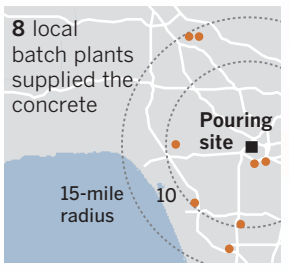
- 889 rooms
- 376,441 square feet of office space
- 53,556 square feet of restaurant and retail space
- 5-level underground garage with 1,092 parking spaces
- Terrace on the 73rd floor

The Grand Pour ballet

Organized and timed deliveries of concrete were crucial in the pouring of nearly 82 million pounds of the slurry, which had to be laid within 90 minutes of the initial mixing.

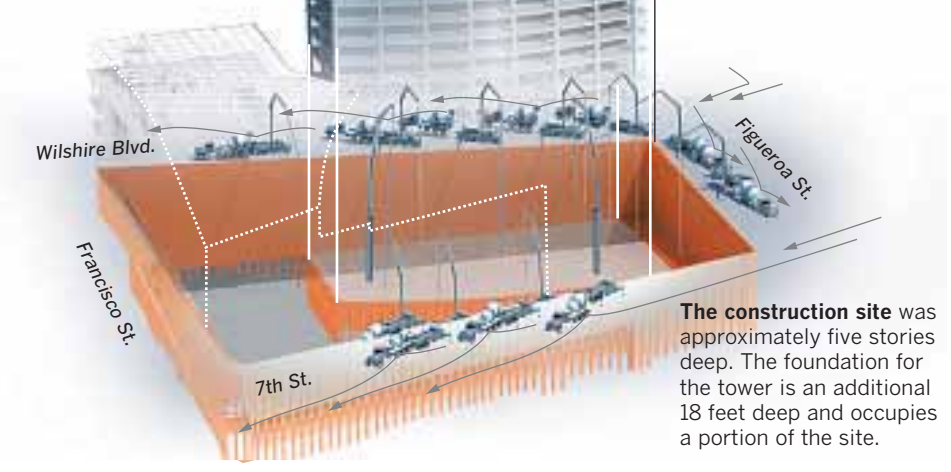
By the numbers

262 drivers
227 mixing trucks
19 pumps
13 hoses



The foundation

The 2.8-acre area bears a 73-story tower, a seven-story podium with ballrooms, terraces and a pool. The tower's foundation was specially designed to help the building withstand earthquakes and windstorms.



The construction site was approximately five stories deep. The foundation for the tower is an additional 18 feet deep and occupies a portion of the site.

Sources: Turner Construction Co., Brandow & Johnston, Inc., AC Martin Inc. Graphics reporting by THOMAS CURWEN, LORENA ELEBEE LORENA IÑIGUEZ ELEBEE, JAVIER ZARRACINA Los Angeles Times

THE GRAND POUR

Orchestrating the laying of an ambitious concrete foundation was job of a lifetime

MEL MELCON Los Angeles Times

MICHAEL MARCHESANO, left, general superintendent, and Bill Depasquale, field operations superintendent, on the foundation. "How could you not want to be part of this?" Marchesano asks.

Michael Marchesano gazed out the window of his third-floor office in downtown Los Angeles and didn't like what he saw. In a far corner of an excavated pit, five stories deep and the size of a city block, stood a mound of dirt as big as a small house. It wasn't supposed to be there.

The weekend construction crew, looking like toy figures, was occupied with other jobs: tying together steel reinforcing bars, stringing polyethylene tubing, arc-welding a raker beam into a lag wall.

It would be three more years before the completed Wilshire Grand tower would rise 1,100 feet above the corner of Figueroa Street and Wilshire Boulevard. With an open promenade and an enormous swoop of glass above the entrance, the translucent airplane wing 73 stories tall promised to redefine architectural possibilities in a city not known for its tall buildings.

Beneath its design was the engineering of what is arguably the most complicated high-rise ever built in the United States. Calculated to sway during powerful Santa Anas and absorb ground movement during the most severe earthquakes, it is wedded aesthetically and technically to the unique footprint of the region.

But what mattered in early 2014 was a pile of dirt.

Marchesano, a general superintendent for Turner Construction Co., knew he had no time to haul it away. A countdown clock on the wall gave him 7 days, 11 hours, 36 minutes, 7.8 seconds before the start of the Grand Pour, an ambitious attempt to lay the foundation of the building's central tower in one overnight session.

Of all the sites Marchesano had worked in the course of 30 years, none had been this complicated. Nor, he suspected, would any be in the future.

This skyscraper, the tallest structure in the western United States, represented a career-defining moment, a daunting and glorious job that had to be approached one step at a time if sanity was to prevail.

The dirt mound was the next step. Just off to a side, they would have to work around it until it could be removed.

Then they would be ready to receive 2,120 truckloads of concrete in a hole 18 feet deep and nearly two-thirds the size of a football field. It had to be poured without interruption in less than 30 hours.

Nothing this size had ever been recorded. In 1999, construction of the Venetian in Las Vegas included a continuous pour that made the Guinness Book of World Records. If the Grand Pour succeeded, it would be bigger.

Marchesano and his team had begun preparing nearly a year earlier: filing permits for street closures, having bus lines rerouted, ordering backup equipment and calculating drive times.

More than 350 workers would be on site, and 227 trucks on the road, looping from batch plants to downtown and back. Any glitch, injury, accident or freeway snarl would jeopardize the plan, and that wasn't even taking into account the weather. Rain or a heat wave could force delays. God would weigh in on that.

For a system as finely tuned as a rocket launch, everyone banked on success, leaving Marchesano to worry about failure.

Let other skyscrapers in other cities be built upon piles and caissons driven into bedrock. The foundation for the Wilshire Grand is a concrete slab.

Its specifications were drawn up by engineers who, after calculating the height and weight of the tower and the forces associated with earthquakes and windstorms, determined that it needed to contain 21,200 cubic yards of concrete and 7.1 million pounds of reinforcing steel.

By some calculations, those ingredients are enough to build an entire 10-story office building.

Design decisions are compromises driven by safety and cost. If the slab were to contain less concrete and be more shallow, it would require more reinforcing steel, and if it were to contain less steel, it would have to extend deeper into the bedrock. Eighteen feet was the middle ground.

For a time there had been talk about layering the foundation in two pours, each 9 feet deep. But given how difficult it would be to connect the two slabs, the idea was shelved.

The numbers for the Wilshire Grand — including 900 hotel rooms and 400,000 square feet of office space — had always impressed Marchesano, who at first was uncertain whether the pour would be possible.

To pull it off, he knew he would need to find room for all the equipment on an already crowded site. He would also have to find a supplier who could make and deliver that quantity of concrete. Neither was a sure thing.

Such problems didn't exist in the open fields of Orange County where Marchesano learned the construction business in the 1980s. After graduating from high school in Irvine and digging trenches for an underground utility, he turned to construction.

He opened a demolition and concrete-cutting company that he named after his wife and children, but the economy turned on him. He lost his home. His mother died. His father had a stroke, and he and his wife split up.

Leaving the state in 1990, he found work on a cattle ranch in Colorado, earned the nickname "Hollywood" and moved up from cleaning feed troughs to riding and doctoring the herd. A year later, a phone call brought him back to Orange County to work for a local builder. He rented an apartment on Balboa Island where he lived with his three children, and he eventually remarried.

He joined Turner in 1999 and supervised the construction of such projects as Disney's Grand Californian Hotel and the Terranea Re-

[See **Foundation,** S15]

A Note from the Chairman

The Wilshire Grand is the realization of a dream and the completion of a promise.

When we purchased this property in 1989, we knew it had an elegant past but had seen the best of its days. I dreamt of a luxury hotel, stunning offices, high-end stores, popular restaurants and public plazas that would invite relaxation. The Wilshire Grand Center today is that dream come true.

We promised Los Angeles a unique property that would attract the best of the best. We delivered the crown jewel of Figueroa Street with 900 luxury hotel rooms, the first new downtown offices in 30 years, and architecture that redefines the essence of downtown.

The Center's tower is the tallest structure in the west and is creating a new Los Angeles skyline. Its unique exterior LED lighting will make the Center an iconic new landmark for the region.

I know the Wilshire Grand Center's InterContinental Hotel Downtown will help draw the international community to this beautiful site and the new hotel rooms will add to the City's ability to attract conventions and the Olympic Games.

The Wilshire Grand Center symbolizes our trust and faith in the strength and power of Los Angeles, the Capital of the Pacific Rim. Los Angeles is my second home and I am proud to make this contribution to its future success.

Some say the Wilshire Grand Center is perfect. But, according to the famous Buddhist monk Bubjung,

Perfection is not something that already exists;
Perfection lies in the in the ever-changing moments that comprise our lives.

This is one of those moments.

Thank you.

Yang Ho Cho
Chairman
Korean Air & Hanjin Group

Thanks to all who helped m

KOREAN AIR
Ashley Chung
Bongsoo Moon
Byung Geon Cho
Chris Park
Doran Lee
Doyoung Kim
Gun Young Lee
Heyane Jung
Ji Heon Kim
Jihee Jun
Jongchul Kim
Jong Chul Choi
Jong Seok Yoo
MinJong Cho
Myeongsun Kim
Oh June Kwon
Penny Pfaelzer
Sangjun Lee
Seong Bae Cho
Seungbum Lee
Tae Woo Lee
Wan Sang Park
Yei Mok Kim
Yongwan Kim

AC MARTIN PARTNERS, INC.
Araceli Gomez
Brad Carpenter
Bruce Konschuh
Bryan Chavac
Calvin Boyd
Carey McLeod
Charnice Burns
Christine Tran
Christopher King
Christopher C. Martin
David C. Martin
Donna Clandening
Edmund Lau
Elisa de Dios-Hernandez
George vanGilluwe
George Kieffer
Gerardo Ramirez
Glenn Yoo
Greg Prelogar
Grit Leipert
Inga Newsom
Isaac Luna
Jay Zapata
Jennifer Anthony
Jesus Banuelos
Joanne Camacho
Jon Starr
Jorge Medrano
Joseph Varholick
Jovan Gayton
Ken Lewis
Lalida Nakatani
Lily Chung
Melanie Gutierrez
Melisa Sharpe
Mesrop Alimazyan
Michael Chang
Michelle Sterling
Michelle Martini
Min Sung
Naoko Miyano
Naoko Miyamoto
Noel Moreno
Oleg Mikhailik
Patrick M. Martin
Peter Kim
Posin Wang
Rachel Eisner
Ricardo S. Aldape
Robert Newsom
Ryan Petersen
Sandra Levesque
Tammy Jow
Timothy Redmond
Xian Hu

A/E BUSINESS, INC.
Ashley Ortiz
Dave Bauer
Hal Roach
Izabela Dimitrova
Jean Matsunaga
Kathy Patito
Luis de Leon
Mason Lam
Oliver Santos
Patrick Rivera
Ricardo Cruz
Stephane Irankunze
Tess Conyers
Tina Marquez
Virginia Duffy

ABM
Al Pineda
Jeff Miller
Stan Bochinak

ACCO
Aaron Frazier
Adrian Corona
Albert Vizcarra
Aldo Morales
Alexander Aguiar
Alvin Carstensen
Andrew Lizarraga
Anibal Chaldez
Anthonie Alvarez
Anthony Gutierrez
Anthony Soto
Antonio Arellano
Art Robledo
Bark Tong
Benjamin Gage
Brandon Scott
Brett Fredenburg
Brian Ginell
Bryan King
Bryan Graham
Buck Franzen
Cameron Tamayo
Carlton Seyforth
Carolyn Butler
Catie Hutchison
Charles Woods
Chris Jones
Chris Walker
Chris Way
Christopher Walker
Christopher Zich
Christopher Mendez
Craig Reynolds
Daniel Valdez
Daniel Pacheco
Daniel Galvan
Daniel Puckett
Daniel Divas
Daniel Gomez
David Habecker
David Acosta
David Garcia
David Haber
David Lee
Debbie Segura
Donald Gilman
Donald Samborski
Elery Brossett
Eli Hartman
Elvarado Banuelos
Eric Frazier
Eric Porras
Erwin Chavez
Eugenio Maldonado
Fareed Thomas
Fernando Vasquez
Fernando Lizarraga
Frank Quinonez
Frank Urso
Friolan Ramirez
George Drake
George Ortiz
Gerardo Mendez
Gilbert Silva
Gilbert Peregrina
Guozheng Li
Hailey Rogers
Harvey Diaz
Hugh Palmer
Hugo Mendoza
Jacob Ruff
James Bock
James Groff
Jason Williams
Jason Follett
Javier Garay
Jeff Bice
Jeff Marrs
Jeff Weaker
Jerry Opzeeland
Jesse Arrelano
Jesse Sanchez
Jesus Rodriguez
Jim Bock
John Napoli
John Yvellez
John Carrillo
John Boncich
John Trumbul
Johnathon Smith
Johnny King
Jonathan Howard
Jorge Barajas
Jorge A. Lopez
Jose Cervin
Jose Carreon
Jose Cervin
Jose A. Perez
Joseph Alvarez
Joseph Lakey
Joshua McLaughlin
Josue Lozano
Juan Mendoza
Justin Lekos
Justin Lekos
Ken Stohr
Kenny Tang
Lanard Jenkins
Leo Fierro
Luis Sanchez
Luis Ortiz
Marco Giron Jr
Marco Cabellero
Mario Martinez
Mario Corona
Mark Segobia
Marquise Charles
Martin Flores
Mathew Lane
Michael Kaczur
Michael Kaufman
Michael McDermott
Michael Black
Michael Soto
Michael Lewis
Michael Kondo
Michelle Shadpour
Miguel Martinez
Miguel Consecion
Mike Antonacci
Milt Goodman
Nelson Aducayen
Nolon Orozco
Omar Beltran
Oriel Valenzuela
Oscar Lopez
Paul Orcales
Paul Cuellar
Paul Anderson
Pete Fortin
Peter Santibaenez
Price Griffith
Quintin Tracchia
Ramiro Avila
Rashaun Sanders
Raul Zavala
Raul Perez
Ray Renneker
Ricardo Palomar
Richard Hand
Richard Yates
Richard Mcdonald
Rick Riley
Rj Falasca
Rj Falsasca
Robert Bonte
Robert Dak
Robert S. Waldron
Rodolfo Ramirel
Rodolfo Ramirez
Ron Canales
Ron Galbreath
Ron Falasca
Ron Galbreath
Ronald Canales
Roscoe Nix
Ruben Fabunan
Ruben Mariscal
Rudy Troncoso
Rudy Ramirez
Russell Meives
Sandy Britton
Saul Castro
Scott Windisch
Scott Clark
Sean Perrier
Son le
Soriano Sergio
Steve Britton
Steven Lope
Steven Ross
Steven Wahlquist
Ted Harvey
Tim Talbot
Todd Harvey
Todd Fulkerson
Tony Hanson
Ty Gray
Vanessa Juarez
Vanssa Juarez
Victor Crawford
Victor Collins
Victor Collins
Victor Moguel
Vince Smith
Vrej Isagoulian
Wayne (Marvin) McDaniels
William Gonzales

ANNING JOHNSON
Alfredo Garibay
Andrew Zarate
Arthur Gutierrez
Carlos Torres
Chris Miller
Daniel Salido
David Salgado
David Steck
Ernesto Luna
Eugene Hnatiw
Francisco Gutierrez
Greg Martinez
Jonathan Ulibarri
Jose Ochoa
Luis Gutierrez
Miguel Perez
Oscar Salazar
Patrick Ortiz
Randy Gonzales
Ricardo Sandoval
Robert Ovalles
Ronnie Lechnya
Samuel Gladney
Steve McDaniel
Steve Byrom
Steven Mellard

ARAGON
Abelardo Orona
Adam Corona
Albert Johnson
Augustin Ramirez
Chris Perry
Edward Maldonado
Eric Garcia
Ernesto Mellado
Francisco Vazquez
Frank McCracken
Humberto Ibanez
Ivan Maldonado
Jesus Hurtado
Joe Pasillas
John Rubio
Jose Zambrano
Juan Gonzalez
Kristofer Gonzalez
Leonard D. Ayala
Marco Rivera
Matt Aragon
Raymond Bennett
Reginald Edwin Hardly
Richard Abbott
Roberto Loza
Roman Campos
Ruben Lopez
Santiago Montes
Tirharga Stone
Yiovang Sanchez

ASSA ABLOY DOOR SECURITY SOLUTIONS
Jon Wiseman

ASSI SECURITY
Adrian Yanez
Angel Ramos
Artavia Gipson
Christian Lopez
Diana Pacheco
Frank Payan
Hernan Cortez
Jim Gresham
Jose Franco
Joseph Sabbatino
Larry Schneider
Mario Rivas Jr
Miguel Salas
Orane Miller
Robert Roman
Valerie Kelly
Waldo Castro

BAGATELOS
Alan Lombarde
Armando Barraza
Brian Walsh
Cory Clerico
Daniel Polanco
Danny Schoonover
David Mendoza
James Hines
Joe Kennedy
Jose Navarro
Kevin Curton
Kevin Studebaker
Kyle Ferret
Noel Modesto
Paul Conroy
Robert Walton
Ruben Reyes
Sal Gomez
Steve Wells
Victor Aguilera

BAKER ELECTRIC
Adrian Diaz
Brian Labit
Daniel Bergstrom
Dave Cullinan
Derek McDermed
Eric Clease
Jessica McMurtrie
Jesus Rodriguez
Jesus Diaz
Luis Valenzuela
Moses Hernandez
Omar Sadoval
Santiago Mora
Sergio Lopez
Zach Portillo

BAPKO
Alejandro Villasenor
Alexander Peterson
Angel Cid
Barnard Pollard
Chance Davidson
Cristian Barajas
Eleuterio Barreras
Eric Grasse
Francisco Starkweather
Francisco Ordaz
Frank Garcia
Frank Contreras
Gilberto Orejel
Jason Corder
Jason Kisner
Jeff Ahmadzai
Jorge Marroqui
Juan Carlos Rios
Julio Valadez
Kyle Stamper
Leonel Blancas
Manuel Fukay
Ricardo Martinez
Roberto Marquez
Temo Tinoco
Wilson Bolivar

BENSON INDUSTRIES, INC.
The Staff at Benson Industries, Inc.

BORBON
Alejandro Valdez
Alfonso Becerra
Alfredo Robledo
Allen Carberry
Aureo Gutierrez
Camilo Ramirez
Carlos Estrada
Carlos Galeano
Carlos Villarreal
Carlos Mouncada
Cory Street
Daniel Gonzalez
Daniel Reyna
David Morales
David Jesus
Eddy De Leon
Edwin Zamacona
Eider Bucso
Eladio Perez
Espiridon Garcia
Everett Jimenez
Faustino Avalos
Federico Rodriguez
Felicia Pawnell
Fuentes Lima
George Santanden
George Ramos
Geovanni Mazariegos
Gerardo Orozco
Harry Velasquez
Hernan Villarreal
Ignacio Melindez
Jaime Diaz
Jason Hernandez
Jason Scott
Jesse Aguirre
Jesus Romero
Jesus Rincon
Jesus Marquez
Joel Hernandez
Joel Larticchia
Johnny Abyad
Jonathan Jarquin
Jorge Arevalo
Jorge Reynaga
Jorge Arrealo
Jorge Andrade
Jorge Arejaio
Jose Monroy
Jose Torres
Jose Morales
Jose Medina
Jose Jesus
Jose salas
Jose Quinonez
Jose Altamirano
Jose Vasquez
Juan Palamor
Juan Barahona
Juan Gracian
Julian Andujo
Kevin Egan
Lance Copley
Leobardo Arambulo
Luis Gonzalez
Maria Valencia
Marico Arevalo
Mario Yanez
Marlon De Leon
Mauro Gaytan
Michael Felix
Michael Salas
Miguel Ayala
Nick Jaramillo
Octavio Gallardo
Pablo Nazario
Pablo Pena
Panfilo Hernandez
Pedro Rivas
Pedro Rivas
Ramiro Achila Ayala
Ramon Michel
Randolph Rosas
Richard Zarate
Robert Dominguez
Ronaldo Camacho
Scott Jacobs
Sergio Ramirez
Sergio Lopez
Ulises Santos
Uriel Reveles
Victor Palamor
Victor Lopez
Virgina Meguerian
Wilmar Velazquez

BRADFORD
Aubrey Johnson
Clemente Martinez
Daniel Martinez
Edgar Medina
Eduardo Ordaz
Eric Smither
Francisco Ordaz
Hilano De La Clare
Jose Avila
Jose Avila
Juan Castellanos
Michael Fiedler
Oscar Ibarra
Richard Tyler Kidd
Robert Aycock
Tim Van Wormer

BRANDOW & JOHNSTON
Beth Aldrich
Gerard M. Nieblas
Han Kim
Jaime Orozco
Jeff Lubberts
Jefferson Hang
Josh Gebelein
Mike Fotch
Norair Tcheurekjian
Peter J. Maranian
Phuoc Tran
Raul Jimenez
Sema Akyurek
Servando Torres
Shigeru Kono
Steve Lam
Steve Carrillo
Teo Francu

BRANDOW & JOHNSTON/ UDC-CIVIL & ENVIRONMENTAL ENGINEERING
Dr. Amit Kanvinde

BREEN ENGINEERING, INC.
Evan Fernandez
Jon Ziegler
Joshua Sowa
Melissa Taguchi
Paul Breen

BRIGHTWORKS
Chris Forney
Drew Shula
Melanie Bontusa
Scott Lewis

CANYON INSULATION
Adrian Castillo
Adrian Baeza
Alexis Salgado
Brian S. Mccarty
Bruno Basulto
David Montes
David Vidrio
David Corona
Eduardo Salgado
Eloy Constantino
Francisco Espitia
Israel Escamilla
Jeffrey Ostness
Jonathan Carmona
Jose Diaz
Jose Parsons
Jose Escalante
Joseph Farmer
Juan Arias
Ken Rienstra
Manuel Linan
Martin Diaz
Mathew Stelle
Nicolas S. Gutierrez
Pavel Salcedo
Ralph Satterfield
Ramon Melchor
Ramon Sanchez
Raul Robles
Rodger Culpepper
Roman Rodriguez
Sergio Ludwig
Steve Shaw
Vicente Salgado

CBS
Alcadia Lopez
Alex Ardon
Asbird Chauona
Blanca Albillo
Brandy Sissom
Darlo Guzman
Emperatriz Calderon
Ericka Herrera -Moreno
Erik Gonzalez
Gilmar Juarez-Cruz
Heraldo Ruiz
Ingrid Cermano
Jaime Chavez
Jaime Hernandez
Johnny Murillo
Jonathan Munoz
Jorge Juarez
Jose Romisa
Jose Lopez
Jose Luis Villanueva
Josue Figueroa
Juana Maldando
Lucia Alvarado
Marbella Albillo
Marcos Ortiz
Mario Gardea
Maybelin Guzman
Monica Hurtado
Noe Gabino
Oscar Albillo
Osmar Albillo
Paulin Balderos
Pedro Albillo
Pedro Vasquez
Rigoberto Valle
Roberto Orozco
Roderico Ochoa
Roli Vasquez
Rosa Gardea
Sergio Barragan
Sonys Rodriguez
Wilber Melgar

CHOATE PARKING CONSULTANTS, INC.
Emerson Flint
Fernando Sanchez
Hector Ultreras
Michael Vetters
Richard "Rick" Choate

CINI LITTLE
Chelsea Lee
Daniel Kwon
Donna Pacione
James H. Little, FFCSI (deceased)
John Shaner
Joseph Grijalva
Kerry Bowden (retired)
Lily Gin
Marleen St. Marie
Michael Perigard
Philip Steeves

CITY OF LOS ANGELES, DEPARTMENT OF BUILDING AND SAFETY
Aldo Ubau
Charles Chang
Charmie Huynh
Darla Abel
David Maclean
Denver Hargis
Domenic Barbato
Donald Crichlow
Francis Ysaguire
Frank Bush
Garo Telmi
Ifa Kashefi
James Powers
Jameson Lee
John Hua
John Weight
Johnny Yutronich
Joseph Eikenberry
Kevin Simonds
Kim Arther
Larry Isidro
Leslie Trujillo
Luis Figueroa
Marcus Levias
Michael Mclay
Mike Packard
Osama Younan
Pascal Challita
Peter Callas
Peter Kim
Preston Gilliard
Rawand Aryan
Richard Dockus
Rickey Jackson
Ryan George
Sorin Varciag
Stephen Dawson
Steve Palchanis
Terry Herr
Tim Wang
Wai Lau

CLEVELAND MARBLE
Abel Ruiz
Adam Maldonado
Alan Sandahl
Alberto Aranda
Alberto Aranda
Alfredo Freire
Andres Paygoza
Anthony Reyes
Anthony DeBlasis
Arnoldo Rodriguez
Arnulfo Garcia
Benjamin DeLeon
Billy Mantos
Bryan King
Carlos Castillo
Carlos Gonzalez
Carlos Saucedo
Christian Morales
Christopher Logan
Chuck Ellis
Claudio Melara
Dana Goar
Daniel Rodriguez
Daniel Ramos
Daniel Martinez
Daniel Garibay
Darash Irannejad
David Smith
David Ortiz
David Hernandez
David Harris
David Espinoza
David Brown
Devin Rini
Doug Westling
Eduardo Padilla
Edward Hernandez
Edward Ramirez
Elias Ghatta
Elias Diaz
Enrique Hernandez
Eric Quijada
Esteban Ibarra
Filemon Salazar
Gabriel Castaneda
Gabriel Flores
Gerardo Serrano
Grant D'Amico
Guadalupe Jimenez
Gus Asaad
Gustavo Guzman-Arrieta
Gustavo Gutierrez
Haik Abrahamian
Hugo Morales
Humberto Solono
Ignacio Rodriguez
Jack Ulloa Jr
Jack Ulloa
Jaime Cerda
James Beauchamp
James Cerda
James Anthony Perrone
Jay Johnson
Jesus Flores
Jesus Sanchez
Joe Kisner
Joel Munoz
John Cuellar
John Coates
Johnny Pinedo
Johnny Rivera
Johnny Pinedo
Jonathan Fuentes
Jorge Cureno
Jorge Hernandez
Jorge Lopez
Jorge Jamaica
Jorgw Portillo
Jose Gutierrez
Jose Alcantara
Jose Jaquez
Jose Estevez
Jose Chavez
Jose Alvarado
Jose Hernandez
Jose Raygoza
Jose Cortez
Joseph Bautista
Juan Diaz
Juan Mendez
Julian Quijaoa
Kevin Roland Jr
Kevin Maloney
Kevin Hapes
Leonel Isidoro
Leopaldo Oceguera
Luis Gutierrez
Marcos Castaneda
Marcos Castaneda
Margarito Velasquez
Mario Cerda
Martin Velasquez
Martin Acosta
Martin Delgado
Mathew Bill
Mauricio Pareues
Michael Savage
Michael Ditri
Miguel Castaneda
Miguel Esquivel
Miguel-Angel Castaneda Jr
Oscar Contreras
Oswaldo Larrinaga
Rafael Robles
Raul Chora
Raymond Fiaijo
Refugio Cervantea
Rene Fierro
Rene Gonzalez
Reuben Padilla
Ricardo Cerda
Ricardo Gonzalez
Richard Baldwin
Robert Ontiveros
Robert Romero
Rodrigo Aguilar
Rogelio Okamura
Roger Villegas
Ronald Battaglia
Ronnie Perez
Ruben Saucedo
Ruben Mata
Ruben Uribe
Rudy Gaxiola
Salvador Adame
Salvador Soto
Santos Servin
Steve Reyes
Steve Bloomfield
Thomas Torres
Tim Pwebb
Tony Mena
Victor Avila

COMET ELECTRIC
Adrian Santana
Alberto Gurrola
Andrew Carrillo
Bryan Hoon
Cirilo Zuniga
Doug Turner
Enrique Huerta
Giovanni Dorico
Ignacio Cobian
Jaime Nunez
Jeff Flannery
Jose Garcia
Leonardo Martin
Leonidas Lara Zuniga
Miguel Rodriguez
Omar Camargo
Othoniel Lopez
Pedro Duran
Reynaldo Sierra
Steven Brown
Victor Gonzalez

CONCO
Aaron Zanudo
Aaron Reed
Abel Castaneda
Adam Meraz
Alberto Limones
Alberto Aguilar
Alejandro Macias
Alejandro Topete, Jr.
Alejandro Garcia
Alfonso Morales
Alfredo Dominguez
Almando Salcedo
Alonso Rodriguez
Andres Macias
Andres Garcia
Andres Villegas
Andres Cruz Gonzalez
Angel Maulion
Anthony Proctor
Antonio Heredia
Antonio Cortez
Antonio Avalos
Antonio Perez
Armando Salazar
Art Aguilar
Art G. Aguilar
Arturo Hernandez
Atenogenes Vasquez
Barry Christopher
Basilia B. Calderon
Bechara Diaz
Benjamin F. Espinoza
Billy Langford
Bob French
Branden Whittlesey
Brandon Weil
Brian Ortiz
Bryant Guerrero
Ceja Octavio
Cesar Vargas Delgado
Charles Foster
Chima Iheaso
Christoper J. Hernandez
Christopher Becerra
Conrad Castellon
Conrad Castellon
Daniel Golden
Daniel Rincon
Daniel Varelas
Daniel French
Daniel Yruegas
Daniel Lopez
Daniel Varelas
Danny Arriola
Danny Delgado
David Ramirez
David Yanez
David C. Yanez Chavez
Diego Mata
Dominic Talley
Donis Ochoa
Edgar Figueroa
Edith Rivera
Eduardo Hernandez
Efrain Casimiro
Eleazar Tejada
Emiliano Zapata
Enrique Diaz Herrera
Eric Vargas
Eric Leon
Eric D. Morris
Erin Walker
Ernest Pulido
Ernesto Escudero
Ernesto Flores
Eziquel Becerra
Fausto Albino
Felipe Garnica
Fermin Vazquez
Fernando Cervantes
Fernando Fierro
Fernando Francisco
Fidel Guzman
Fidel Gonzalez, Jr.
Fidel Hernandez
Fortino Suarez
Francisco Lopez
Francisco Gonzalez
Francisco Perez
Francisco Salazar
Francisco Hernandez
Frank Chavoya
Frank Carpenter
Fredy Salazar
George Domingo, Salas
Gerardo Aldapa
Gerardo Mejia
Gerardo Torres
Gilbert Brizuela
Gonzalo Vasquez
Gorge Carrillo
Greg Child
Guadalupe Meraz
Guillermo Arteaga
Gustavo Pelayo
Gustavo Valencia
Henry Campos
Herbert Palacios
Heriberto Garcia
Hervin Flores
Hugo Martinez
Hugo Martinez
Ignacio Diaz
Ilario Sahagun
Ines Ney Arellano
Isaac Reynoso
Ismael Castaneda
Ismael Gallegos
Ivan Hernandez
Jaime Ochoa
Jaime A. Velasquez
Jaquinius Robinson
Javier Cano
Javier Hernandez
Jaye Villa
Jessi Casillas
Jesus Orozco Torres
Jesus U. Landeros
Jesus Valencia Ibarra
Jimmy Gomez
Joel Gutierrez
John Hipolito
Johnny Lockett
Jonathon Sanchez
Jony Ochoa
Jorge Villalobos
Jorge Gomez
Jorge Hernandez
Jorge A. Rodriguez
Jorge A. Velasco
Jorge A. Chong
Jose Ambriz Varela
Jose L. Padilla
Jose Velasco
Jose Aguera
Jose Llamas
Jose Trujillo
Jose Miranda
Jose Villegas
Jose A. Vazquez
Jose A. Diaz
Jose A. Torres
Jose L. Perez
Jose L. Marquez
Jose L. Cardenas
Jose Luis Sotelo
Jose Luis Rodriguez
Jose Luis Aguilar
Jose Luis Velasco
Jose Luis Garcia / Tamayo
Joseph Garcia
Josh Maturino
Joshua Hernandez
Joshua Enriquez
Juan Martinez
Juan Tenorio
Juan Ortiz
Juan Campos
Juan Carrillo
Juan Velasco
Juan B. Ramirez
Juan Carlos Gonzalez
Julian Torres
Karo Topchyan
Kevin Sillas
Lee Whyms, III
Leo Morales
Leonel M. Gallegos
Leopoldo Alcocer
Leviticus Richardson
Lionel W. Ruiz
Luis Marquez
Luis Casillas
Luis Alfredo Jauregui
Luis Garcia Martinez
Luis J. Avila Barrios
Lynwood(Sean) Carr
Maizer Ouijdani
Manuel Perez
Manuel Ortiz
Manuel Velasco
Manuel Valle
Manuel Robles
Manuel Landeros
Manuel J. Castro
Mariano De Paz
Mariano De Paz
Mario T. Pierce
Martin Hernandez
Martin Ledezma
Martin A. Sanchez
Matthew Ferrell
Maurice D. Murphy
Mauro Ramirez
Medardo Lopez
Michael Price
Miguel Lopez
Miguel Andrade
Miguel Chavarria
Miguel De La Rosa
Moises Cano
Moises Sotelo
Narciso Barba
Nestor Miranda
Nick Alpaugh
Omar Sanchez
Onesimo Campos
Osvaldo G. Amezcua
Parriss Stull, Sr.
Pascual Barron
Pascual Gomez
Patrick J. Schiavello
Paul Cruz
Philip Buck
Rafael Perez
Ramen Jimenez
Ramiro Del Rio
Ramiro
Ramiro Ruiz
Ramon Hernandez
Raymond M. Lopez
Refugio Perez
Refugio Perez
Reynaldo Cienega
Ricardo Granados
Ricardo Hernandez
Ricardo Ruiz
Ricardo Garay
Richard Walden
Richard Lindstrom
Ricky Millan
Rigoberto A. Varela
Robert Alfredo Munoz
Rodolfo Heredia
Rodolfo Hernandez
Rodrigo Lopez
Rony Sotelo
Rony Otero-Gadea
Ruben Perez
Rudy Ponce
Ryan Dover
Ryan Preston
Salvador Whalen
Salvador Gallegos
Sean Mann
Sergio Rodriguez
Sergio Rodriguez
Sergio Vazquez
Shaffven Knight
Shane T. Skinner
Silvino Flores
Steve Strader
Tabah Nez
Tomas Chavez
Tomas Camargo
Tony Reed
Vicente Arciaga-Rangel
Virginio Ruiz
Zeferino G. Rodriguez

CONDOR/FORCEFIELD
David Barraza
Dennis Mebane
Earl Weiss
Fred Weiss
Giovanny Gomez
Janice Ohta
Jesse Zavala Jr
Jonathan Tejeda
Jose Garibay
Jose Garibay
Josh Fricke
Kennin Gonzales
Luis Casillas
Mario Garibay
Omar Reynoso
Osvaldo Rivera
Rita Reyna
Romero Gonzalez
Ruben Naranjo
Saul Casillas
Sergo Gonzalez
Spencer Wilson
Steve Decker
Thomas Pico
Zacarias Francisco

CONTRACT DÉCOR
Carlos Cazares
David Stewart
Gregg Cooper
Josh Baker
Justin Frye
Leonard Welch
Marcos Mendez
Mathew Centeno
Nicholas Schaub
Nicholas Wright
Oscar Munoz
Peter Griffes
Robert McCulloch
Scott Silverman
Steven Lopez

COURTNEY
Abraham Basaldva
Alejandro Hernandez
Andrew Guzman
Angel Potrero
Antonio Ramirez
Armando Guzman
Carlos Villoa
Carlos Castro
Christopher Suarez
Christopher Ramos
Chuck Point
Efrain Vega
Enrique Orozco
Enrique Sanchez
Esteban Sanchez
Evaristo Sanchez
Felipe Gonzalez
Fernando Ochoa
Filberto Rizo
Francisco Badillo
Gariel Cervantes
German Estrada
Gilberto Flores
Hector Magana
Henry Vasquez
Humberto Comejo
Ignacio Monguia
Jaime Gonzalez
Jaime Navaro
Javier Aguilera
Jesus Sanchez
Jesus Leon
Jesus Chavez
Jorge Chavez
Jose Tadeo
Jose Lara
Jose Cervantes
Jose Aguirre
Jose Chavez
Joshua Beeks
Juan Balderrama
Julio Juarez
Ken Hawthorne
Luis Rey
Luis Chavez
Luis Gonzalez
Luis Pacheco
Luis Antonio Gonzalez
Manuel Abrego
Marcos Suorez
Mario Erives
Martin Rey
Moises Moraels
Omar Lopez
Otto Suarez
Ramon Quezada
Raul Nava
Refugio Aguilar
Ricardo Quezvedo
Roberto Martinez
Roberto Solis
Rodolfo Rey
Rosario Coronel
Salvador Magana
Salvador Arroyo
Steve Robles
Tomas Estrada

CSI
Aaron Alarcon
Adapto Garcia
Andres Alvarez
Andrew Ramirez
Eric Gomez
Eric Villapondo
Erik Loaza
Gilbert Franco
Guillermo Galvez
Javier Gurrero
Jorge Sahagun Guzman
Jose Gomez
Jose Alarcon
Jose Gomez
Juan Teopile
Luis Perez
Manuel Nava
Maximliano Carrillo
Raul Coronado
Roger Nunez
Salvador Lopez
Tereso Banuelos
Walter Young

D.N TANKS
Abel Bravo
Adan Cruz
Fredy Lopez
Geovanni Elias
Humberto Vasquez
Jason Brannon
Javier Rojas
Jesus Diego
Jose Guzman
Kyle Woodward
Malcolm Douglas
Meliton Torres
Victor Chairez

DURAY
Adam Plummer
Alan Crismeir
Daniel Olswang
Gerardo Vargas
Robert Lepik
Scott Morgan

ELLJAY ACOUSTIC
David Santibanez
Eduardo Garcia
Ernesto Trejo
Frank Goodie
Justin Tejada
Michael Shinn
Mitch Rethwisch
Monce Romero
Nikolay Vinnikov
Randy Harris
Robert Duran
Scott Kelsey
Sergio Guerrero
Steven Kirby

FORTUNE SHEPLER SALING
Jamie Fortune
Jim Fortune
Scott Shepler

GERDAU
Aaron Malloy
Adrian Mendoza
Albert Duarte
Alex Cly
Alex Recio
Alfonso Miranda
Andy Crawford
Anibal Romero
Anthony Tuvalu
Anthony Thompson
Antonio Hernandez
Armando C. Altamirano
Audelino A. Ramirez
Branden Walker
Brian Byrd
Brian Suttle
Bruce Ball
Calbert Begay
Chad Fiscus
Chris Walker
Chris Lee
Christian Robles
Christian Salas
Christopher Wells
Daniel Aguilar
Daniel Nez
Daniel Fonseca
Daniel Harmon
Daniel D. Torre
Daniel P. Ramirez
Danny Harmon
David Whitten
David Castro
David Vargas
David Tafoya
David Rangel
Davon Tittle, Sr.
Dent Tadaka
Derek Santos
Devonte Merrifield
Dominic Rabay
Donovan Passi
Doug Jordan
Douglas Rottiers
Duwone Oard
Dylan Campbell
Enhelbey Alvarado
Fernando Jacobo
Fernando Jacobo
Florence Begay
Francisco Islas, Jr.
Francisco Ramirez
Gabriel Orellana
Gary Hartwig
Gary Jr., Wynglarz
George Coleman
Gibran Guzman
Glen Candelaria
Heath Perrault
Hector Uribe
Henry P. Diaz
Iruviel Mendoza
Isaiah Buffington
Jacinto, Rubio Pascual
Jacqueline Pruitt
Jaime Herrera
Jared Rivera
Jason Rubio
Javier Munoz
Jerry Collins
Jesus Rubio, IV
Joel Ruvalcaba
Jonathan Brown
Jorge Cortez
Jose Banilla
Jose Martinez
Joseph Frazier
Jovante Fryson
Juan Perez
Julio Alvarez
Julio Varela
Julymer Ediza
Keith Kurovsky
Kelvin Williams
Kendall Moore
Kenneth Latu
Lamonica B. Dillon
Lee Colledge
Luis Sanchez
Luis Polanco
Luis Martinez-Herdid
Manuel A. Martinez
Marcial Tulemelgoza
Marcos Paniagua
Marcus Griffin
Marcus Gonzales
Martin A. Gomez
Mathew Johnson
Matt Wichert
Mauro E. Mazon
Michael Waller
Noah Farshad
Oscar Lopez
Parriss (Mikel) Stull, Sr.
Paul Olivas
Paul Olivas
Pedro Banda
Perry Bell
Quincy Lunford
Rafael Marquez
Rafael Chavez
Raul Aleman
Raul, Jr. Carrasco
Raymond Gray
Rene Guerra
Rex Kamoss
Richard Smith, Jr.
Richard Segura
Richard Santiago
Richard T. Johnson
Robert Norris
Robert Berumen
Robert Berumen
Ronnie Charley
Ruben Laurente
Ryan Fisher
Sebastian Alonzo
Sefi Edery
Sefi E. Dery
Steve Velez
Tony Lemmon
Tony Cerza
Tony P. Cerza
Traves Smith
Victor Aguilar
Wilfredo Menjivar
William Bond
Willie Graham, III
Zack E. Palfy

GLUMAC
Brian Johnston
Brian Stern
Charles Foreman
David Summer
David Park
David Maghen
Gabriela Toma
Helen Vakil
Jacob Chan
Joseph Fong
Kameron Beeks
Kimberly Tran
Kristopher Haycook
Laurie Michelon
Michael Ho
Michael Adams
Mirno Del Rosario
Nune Yegiazaryan
Peter Wasef
Shamir Mohideen
Souren Torossian
Steve Straus
Steve Hoerig
Sung Ju
Tee Yatpiyakul
Thomas Xu

GOODWIN CONSULTING
Bob Goodwin

HASSON
Aaron Gutierrez
Adam Sanchez
Alan Gutierrez
Alberto Montes
Alejandro Cervantes
Alfonso Alvarez
Alfredo Alvarez
Andres Ramblaz
Andres Aguilar
Andrew Piscopo
Anthony Tarin
Anthony Costello
Aristeo Hernandez
Arlo Valverde
Arnold Hall
Arnulfo Solis
Baltimore Wagner
Cesar Avalos
Christopher Whitzel
Craig Bergfors
Douglas Coromac
Edgar Serrantos
Enrique Gil
Ervin Lasane Jr
Fabio Moreno
Gerardo Santoyo
Harry Sapena
Hector Portillo
Hugo Hernandez
Hugo Avila
Irving Omar-Lara
Israel Arevalo
Jeff Jackson
Jesus Rivera
John Munje
Jorge Lemus
Jorge Avila
Jorge Avila-Meza
Jorge Portillo
Jose Cedillo
Jose Leon
Jose Avila
Jose Noyola
Jose Maldonado
Juan Alejo
Juan Perez
Lenny Siordia
Leonel Jimenez
Luis Ramirez
Manuel Olmos
Marco Noyola
Mario Galvan
Mario Avila
Martin Rivera
Martin Gutierrez
Miguel Avalos
Miguel Cortes
Miguel Aguilar
Miguel Gutierrez
Mike Wozniak
Milton Jimenez
Noel Macias
Oscar Sermeno
Pablo Nazario
Pascual Moreno
Paul McDonald
Pedro Aguilar
Prospero Hernandez
Raul Canizalez
Rene Ramblaz
Richard Tarin
Robert Rodriguez
Robert Gordon
Robert Rasmussen
RObert Cristobal
Rodolfo Lopez
Rodrigo Ceballos
Ronald Jones
Rony Grijalva
Rosalio Quezada
Rosalio Quezada
Ruben Villanueva
Victor Avila
Victor Nava
Zamudio Reyes

HEITMANN & ASSOCIATES, INC.
Andy Andrews
Charles Kilper
Glenn Heitmann
Phil DeSautell

ISEC
Abraham Pacheco
Adam Rincon
Alan Olick
Alberto Hernandez
Alvaro Santiona
Alvaro Garcia
Angel Vargas
Anthony Jiron
Antonio Mejia
Armando Lopez
Armando Villa
Arturo Lopez
Austin Banda
Austin Galvan
Blake Estrada
Brandon Burnett
Brittney Zuniga
Bryan McLeod
Bulmaro Villa
Carl Maldonado
Carlos Santizo
Carlos Escobar
Charles Nightingale
Christina Greystone
Cody Gerstel/new LN-Dykstra
Dana Barone
Daniel Del Rio
Daniel Haro
Daniel Aleman
Daniel Perez
David Ramos
David Haro
David Stanley
David Gorbutt
Edson Bernal
Eduardo Villa
Enriquez Marfrid
Eric Peebler
Erik Garcia
Erik Leon
Felix Carrillo
Felix Estrada
Fernando Arreola
Fernando Armenta
Francisco Gonzales
Francisco Ruelas
Francisco Chavez
Frank Iwamizu
Frank Hyatt
George Garibay
Gerardo Camon II
Gerardo Camon
German Villa
Gerrad Gerber
Greg Timmerman
Guillermo Adame
Guoxiang Zhony
Hector Vazquez
Hector Anguiano
Henry Torres
Henry Magana
Herbert Reyes
Humberto LopeZ
Ignacio Meza
Irvin Castillo
Irwin Pacheco
Jacob Campbell
Javier Montoya
Javier Galvan
Javier Valencia
Jermone Arellano
Jesse Cerna
Jessie Garcia
Jesus Lugo
Jesus Cervera
John Quintero
Jorge Avina
Jorge Cardona
Jose Rueda
Jose Quintero
Joshua Collins
Josue Fierros
Katelynne Tyler
Lacey Zaycher
Luis Ortiz
Luis Flores
Manuel Panduro
Mario Noriega
Mark Loeffler
Michael Mendora
Miguel Sanchez
Miguel Berrelleza
Misael Pastrana
Nick Elle
Nick Angulo
Octavio Villagomez
Onesimo Munoz
Pascual Cubias
Patrick Fernandez
Patrick Doran
Paul Shupe
Paul Quintero
Pedro Hermosillo
Philip Rivera
Rafael Ramirez
Rafael Escobar
Rafael Castillo JR
Rafael Castillo
Rafael Garcia
Randy Fernandez
Rene FLores
Ricardo Rivera
Rich Moreau
Richard Schwandi
Richard Magana
Richard Mercado Jr
Richard Wiles
Rickie Negrete
Rigoberto Cavazos
Robert White
Robert Mitchell
Robert Luna II
Roberto Ramirez
Rodolfo Zatarain
Rogelio Lozano
Rouben Sarian
Ryan Luna
Ryan Wrobel
Seamus Fallon
Steve Gorbutt
Susan Andujo
Thomas Macearland
Tim Cantu
Todd Brown
Tom Duncan
Victor Marquez
William Le Master
William- Jeremy Wood

ISENBERG & ASSOCIATES, INC.
Ashley Calhoun
Michelle Isenberg

KINYON
Aaron Gibson
Abel Tejada
Adam Harleman
Adam Ovalle
Adrian Barragan
Alberto Naranjo
Alberto Ramirez
Alex Espinoza
Alex Correl
Alfonso Delgadillo
Alfredo Aguilar
Angel Holguin
Anthony Tineo
Anthony Meade
Antonio Gonzalez
Antonio Rodriguez
Antonual Brice
April Gaston
Armand Franco
Audrey Ceja
Boris Flores
Brandon Vizcarra
Brett Evans
Bryan Butler
Carlyn Mcdonald
Cesar Carlos
Christopher Flores
Christopher Moreno
Craig Lynn
Crystal Ramirez
Daniel Castro
Daniel Flores
Danny Messer
Darnell Lucky
Darryl Fuller
David Sprenger
David Guzman
David Felix
Dennis Anderson
Deserie Lame
Dexter Thomas
Dominic Gomez
Edgar Ramirez
Eduardo Felix
Edwin Lopez
Edwin Aguirre
Efren Jimenez
Ernesto Godoy
Evrol Andrews
Fernando Tshmblanga
Francisco Orellana
Gabriel Loera
Gabriel Bermundez Sr
Gabriel Burmudez
George Cabrera
German Rodriguez
Gilberto Camarena
Gilmar Domingo
Guadalupe Duncan
Hans Crawley
Heriberto Garcia
Irma Rodriguez
Irma Judge
Isaias Zamora
Ivan Gonzalez
Jaime Jimenez
James Lesperance
James Kennedy
Javier Ramon
Jesse Cervantes
Jesse Alvarez
Jesus Villanueva
Jesus Zapian
John Barlow
Jorge Reina
Jose Fuerte
Jose Dondiego
Jose Rodriguez
Jose Gomez
Jose Medina
Joseph Kirkland
Juan Parra
Juan Torres
Juan Reyes
Juan Gonzalez
Kevin Kinyon
Kimberly Woodbury
Kupenda Coleman
Kyle Winn
Leland Richardson
Leonel Mendez
Leonel Estupinan
Lilyan Menendez
Lorenzo Rusconi
Louis Hernandez
Lucas Smith
Lucio Fernandez
Luis Bermudez
Luis Torres
Manley McNinch
Manuel Degadillo
Marcus Bevel
Mario Estrada
Mario Reyes
Mark Mc Carter
Martin Gallardo
Melinda Gonzalez
Micah Roberts
Michael Maritschnig
Miguel Simental
Nancy Rangel
Natasha Tave
Olga Avila
Paul Duniad
Philip Rowland
Phillips Jones
Rafael Santana
rafael Ambriz
Ramon Salazar
Randy Baca
Ricardo Cortez
Ricardo Dyran
Richard Burns
Robert Chase
Rosa Garcia
Rosendo Campuzano
Salvador Hernandez JR
Salvador Hernandez III
Salvador Esparza
Samuel Carmena
Scott Zimmerman
Shad Mohammed
Steven McClam
Tamara Hawes
Thomas Anderson
Tomas Rosoles
Tyler Bagwell
Victor Delgado
Victor Correa
William Requeno
William Hickman

L2 SPECIALTIES
Alberto Magallon
Anthony Thompson
Brian Jones
Carlos Perez
Chris Shewdrick
Eduardo Estrada
Eric Rascon
Gene Leasher
Joaquin Bon
Joseph Martinez
Josh Shendrick
Juan Garcia
Mark Conteras
Mathew Taylor
Michael Taylor
Miguel Fuegoso
Nicholas Hernandez
Richard Linnastruth
Ruben Zarco
Shane Leasher
Sonny Esquiuel
Steve Blasi
Steven Tamayo

LERCH BATES
Arnold Pinkney
Kevin Thompson
Lance McMasters

LIGHTING DESIGN ALLIANCE
A.G. Dilshad Ahamath
Amy Pennebacker
Andrew "Andy" Powell
Arex Soontharuch
Charles "Chip" Israel
Daniel Cortes
Daniela Vela
Jason Stroebel
Laura Wu
Likhitha Rangaswamy
Matthew Bates
Meng Gong
Salina Slattery

MALCOLM DRILLING
Adan Mendez
Alejandro Garcia
Alvaro Lozano
Andrew Mackie
Anthony Castanon
Arturo Bautista
Brendon Cendejas
Chandler Noble
Christian Alvarado
Daniel Ortiz
Emilio Simental
Eusebio Garcia
Garrett Nanos
Greg Segura
Gregory Cheairs
Guillermo Jimenez
Gustavo Medina
Ignacio Ortega
James Hickey
James Auten
Jereme Skillman
Jesus Flores
Jose Barba
Jose Diaz
jose Estrada
Jose Diaz, Sr.
Jose Carlos Arredondo
Juan G. Rodriguez
Juan Manuel Aragon Jr
Julio Gutierrez
Kevin Castanon
Luis Jimenez
Manuel Ayala
Manuel Ayala
Mark Sterner
Miguel Bernal
Miguel Favela
Ramiro Hernandez
Rich Elwart
Thomas Le Beau

MARTIN BROTHERS
Adalbetro Rodriguez
Alan Velazquez
Albert Espinoza
Andy Cisneros
Angel Yanez
Arturo Salcedo
Augelbento De Dios
Aurelio Lepe
Carmen Ortiz
Cesar Jimenez
Che - Phi Hy
Daniel Olivas
edgar cisernos
Efren Grave
Elfego Lopez
Eloy Duarte
Eloy Duarte
Erwin Torres
Evidulfo Librado
Eziquel Rodriguez
Fausto Gaxiola
Fernando Borjas
Fidel Quiroz
Gadi Lopez
Jaime Nunez
Jason Almonte
Javier Haro
Jesus Hurtado
John Rodriguez
Jose Flores
Jose Ramirez
Jose Laretta
Jose Lopez
Jose Juan TOrres
Juan
Juan Aranda
Juan Juarez
Leonardo Martinez
Luis Rojas
Manuel Cortes
Manvel Morales
Martin Rodriguez
Miguel Acosta
Miguel Manzo
Miguel Acosta
Nelson Romero
Nicolas Vargas
Pedro Castro
Pedro Antonio Campos
Ramon Garcia
Ramon Gil
Ramon Garcia
Reyes Palma
Ruben Sanchez
Sabas Martinez
Salvador Hernandez
Victor Borjas
Virgilio Ruiz
Wence B. Padilla

MARTIN PROJECT MANAGEMENT, INC.
Andrea Ramella
Christopher C. Martin, CEO
Danielle Martin Spicer
Jeanet Owens
Kenneth J. Aspis
Melinda Walker

MBJ
Anthony Monroe
Anthony Wayne Fagan, Jr.
Arron Hoskins
Brian Greene
Bruce Hickman
Charisma Washburn
Chris Fulton
Corey Landren
David Blannon
David Barnes
Debrionne Yopp
Deyonta Norton
Doug Gray
Jai Philips
Jonathan Young
Jose Alvarez
Joseph Hightower
Ken Price
Khary Daise
Lawrence King
Lawrence Blannon
Leo Jimenez
Matthew Lemieux
Medran Robinson
Melvin Kidd
Namon Jimmons
Paul Dunlad
Robert King
Tayon Richer

MCKENDRY DOOR
Adolf Gaydel
Alan Aguilar
Bryan Payne
Connor McKendry
Enrique Cabral
Ivan Isordia
John Maniard
Michael Luce
Sergey Tokarets

MONTBLEAU/ CUSTOM INSALATION
Adam Vallejo
Adrian Sanchez
Adrian Sanchez
Alejandro Polino Jr
Alfons Wetzstein
Alfredo Barcenas
Angelo Serigna
Anthony Barcenas
Antonio Mora
Brent Ghent
Brian Alexander
Carlos Ramirez
Carlton Hershey
Cesar Ovalle
Chris Mexia
Chris Gesselman
Chris McCoy
Corry Nowwels
Curtis Wilson
Daniel Casarez
Darin Ravy
David Hansen
Fernando Gutierrez
Francisco Carrillo
Frank Quintero
Frank Luzano
Gabriel Diaz
George Hernandez
Gerry Walker
Gino Baez
Greg Friend
Guadalupe Loera
Henry Torres
Jacobs Davis
Jason Nabors
Jason Goering
Jerry Lozano
Jesus Reza
Jesus Valenzuela
Joe Duarte
Jose Loera
Jose Esparza
Jose Quintero
Jose Quintero
Jose Rodriguez
Keith Cyons
Manuel Osuna
Marcus Correia
Mathew Hernandez
Matt Fredericks
Moises Torres Jr
Nate Novwels
Nick Gutierrez
Norm Sanborn
Octavio Hernandez
Philip Ruiz
Rafael Loera
Rafael Rodriguez
Randy Stump
Robert Paplia
Scott Lee
Theron Soteros
Thomas White
Tim Novwels
Travis Davis
Victor Escobedo
Victor Rodriguez
Wayne Copeland
William Freeman
William Elli
William Le Master

NORTH STAR
Abel Castro-Garcia
Acacio Reyes
Alejandro Mayer
Angel Romero
Antonio Avelar
Armando Murillo
Barbaro Hernandez
Bernabe Pastrana
Bernardo Acevedo
Calixto Rodriguez
Calixto Segura
Carlos Lopez
Carlos Lopez-Caballero
Celina Romero
Cesar Jimenez
Cesar Arredinda
Clemente Rodriguez
Clemente Rodriguez
Dario Rojas
David Lopez
Edgar Alvarez
Edgar Galicia
Eduardo Hernandez
Elizabeth Torres
Emmanuel Lopez
Enrique Castanon
Ernesto Orozco
Esteban Morales
Everardo Jimenez
Everardo Jimenez
Felipe Quinonez
Felix Bravo
Fenerico Ibarra
Fernando Navarro
Francisco Natividad
Fredy Carayeo
Gabriel Mendez
Gabriel Martinez
Garciela Sandoval
Geraldo Santiago
German Gonzalez
Guadalipe Carranza
Guillermo Hernandez
Hector Felix
Hector Ruiz
Herman Portillo
Humberto Montes
Jaime Quinonez
Jaime Calderon
Javier Flores
Jerome Givens JR
Jesus Castaneda
Jesus Cabreca
Jesus Borojas
Jonathan Torres
Jorge Sainz
Jose Morovillas
Jose Izaquirre
Jose Ibarra
Jose Martinez
Jose Santaneno
Jose Guadalupe Carranza
Juan Morales
Juan Zamudio
Juan Marmolejo
Juan Solis
Juan Pablo Velasquez Velez
Julian DeLa Luz
Lorenzo Ramirez
Luis Zuniga
Luis Romero
Marcos Galvan
Marcos Torres
Marcy Garcia
Mario Solorzano
Mario Xacur
Mario Solorzano
Martha Cortes
Modesto Rivas
Navarro Arnulfo
Norberto Rios
Omar Navarro
Oscar Ayala
Oscar Gutierrez
OScar Gutierrez
Osvaldo Gonzalez
Pablo Lopez
Pablo Lopez
Pedro Martinez
Rafael Juvencio
Rafael Juvencio
Ramiro Hermosillo
Ramiro Gonzalez
Ramon Terrones
Ramon Rivera
Raymond Ocegvera
Rene Contreras
Rigoberto Castillo
Rogelio Leyva
Ruben Perez
Sergio Quiroz
Sergio ROdriguez
Suget Pinto
Ventura Sanchez
Victor Figueroa
Walter Castro
Wilson Barrios

OLDCASTLE
Abel Alvarado
Adrian Baeza
Andy Burgos
Anthony Macedo
Armando Morales
Arturo Esparza
Bryan Kester
Chris Wilson
Chris Driscoll
Daniel Perez
Daniel Herrera
Edward Norman
Fabian Garcia
German Reyes
Greg King
Ismael Castanon
Jason Hahn
Jesus Torres
Jose Cruz
Maurice Hale
Michael Aguirre
Rany Prak
Rene Rodriguez

OTIS
Aaron Fitzsimmons
Albert Monfort
Alexander Reyes
Allen Ward
Andrew Johnson
Andrew Vallowe
Anthony Meehl
Anthony Phillips
Ben Mathis
Benjamin Bejarano
Branden Long
Brent Nix
Brett Donaway
Bryon Chiles
Carlos zaro

make this dream come true.

Yang Ho Cho
Chairman
Korean Air & Hanjin Group

Chad Weaver
Charles Garcia
Chris Miller
Chris Elbery
Chris Frazier
Colin Pearson
Corey Gibas
Cuauhtemoc Castro
Daniel Markley
Dantonio Mckinney
Darlyn Rosario
Dave Gentzler
David Rodriguez
David Smith
David Gilwa
David Dumont
Dean De Las Alas
Dennis Martin
Douglas Wright
Eddy Toapanta
Elias Kotto
Emmanuel Moreno
Eric Tate
Eric Venegas
Eric Bronikowski
Erik Brown
Feleix Duc Duc Truona
Garrett Daly
Gerard Degan
Giancarlo Guanvechio
Gil Alvarez
Greg Barnes
Henry Luna
Jake Reiter
James Denton
James Head
Jason Ricchiardi
Javier Garcia
Jeff Long
Jeff Engholm
Jeff Gibas
Jeremy Horton
Jesus Garcia
Joe Aguilar
Joe Borden
John Wall
John Kriss
Jon Henning
JOn Poverell
Jonathan Salazar
Jorge Gutierrez
Jose Caballero
Joseph Guzman
Joshua Sluka
Juan Aguilera
Justin Dolin
Justin Vosburg
Justin Gibbs
Kenneth Lundy-skube
Kevin Scott
Kyle Scott
Lee Hardew
Manuel Becerril
Marcus Burton
Marcus Steuer
Marshall Bennett
Martin Sandoval
Matt Hunter
Michael Van Houtte
Michael Gonzalez
Miguel Henderson
Nathan Garcia
Nicholas Metzger
Nick Barta
Oscar Vasquez
OScar Astorga
Paul Kibler
Paula Bryant
Richard Gridloy
Richard Tapia
Rob Rayner
Roberto Huerta
Roberto Ordonez
Rod Preece
Russ Elmore
Ryan Siebers
Ryan McKinnon
Sam Johnson
Scott Congrove
Scott Springfield
Scott Jones
Sergio Delgado
Shawn George
Steve Guthrie
Trevor Mass
Tyler Achroyd
Vicent Rodriguez
Vincent De Las Alas
William Gonzalez
Yvette Martinez

PAN PACIFIC
Adam Cameron
Albert Armijo
Alfredo Gonzalez
Alvaro Guadarrama
Andrew Davalos
Andrew Hill
Andy Wightman
Anthony Giddens
Arturp Felix
Bryan Pope
Carlos Godinez
Carlos Gonzalez
Cody Zaruba
Daniel Overton
Dave Gilmer
David Loy
David Grody
David Rauls
Dean Hite
Delten Davidson
Eddie Wise
Einar Viana
Eric Chavez
Fernando Nevarez
Gerry Kennon
Gilberto Villalobos
Humberto Palafox
Jamal Maxey
James D. Stremple
James D. `Suess
Jesus Chavez
Jesus Valencia
Jesus Silva
Jimi Priest
Jimmy Timmons
Joe Briley
Joel Preston
Jose Martinez
Jose Avila
Jose Medina
Jose Villasenor
Jose Reyes
Joseph Kendall
Joseph Richard Adelizzi
Juan Martinez
Juan Garcia
Keith Reynolds
Kenneth Williams
Kevin Stiehl
Kyle Winbauer
Lafeyette Tale
Larry Jones
Luis Gonzalez
Manuel Guizar
Mario Avalos
Mark Rosas
Mark Madrid
Mark Shafer
Marques Hooper
Mathew Long
Michael DePalma
Michael Menear
Michael Sanchez
Miguel Cortez
Mitchell Miles
Mychal McQueen
Nelson Hernandez
Neptali Millavilleda
Omar Galnoo
Patricia Herron
Rey Jimenez
Richard Ibarra
Richard Alvarez
Robert Nelson
Robert Walczak
Robert Balos
Robert Miranda
Rodrick Nicholson
Ryan Meyer
Sergio Carmona
Sergio Reyes
Sergio Segura
Servando Hernandez-Lopez
Shawn Bowen
Shawn Poston
Tracy Gillard
Tristan LaLove
Troy Teutsch

PARK WEST
Anibal Lopez
Cameron MacDonald
Carlos March Rodriguez
Carlos Gonzalez Garcia
Cesar Ruelas
Damien Barajas
Daniel Navarro
Edgar Alvarado
Eduardo Avila
Emmanuel Lozada
Ezequiel Betancourt
Fernel Gamez
Francisco Rivera
Gilberto Saucedo
Hector Enciso
Heriberto Garcia
Jesus Navarro Ruiz
Jose Sandoval
Juan Roman
Juan Moreno
Juan Carlos Ceja
Manuel Rojo
Manuel Rivas
Mario Maya Lopez
Mark Fragola
Oscar Hernandez
Rafael Lopez
Ramiro Velazquez
Ramiro Herrera
Ramon Garcia
Raul O. Aguilar
Rogelio Villasenor
Salvador Gutierrez
Sergio Lopez
Summer Munez

PENHALL
Alex Mack
Domingo Elizarraraz
Dominjo Elizarraraz
Ernesto Canchola
George Rice
Helmer Prtillo
Joe Alfaro
Joe Barragan
Jorge Moreno
Julio Topete
Karl Douroux
Liana Tagaloa
Luis Aldana
Luis Martinez
Mario Perez
Miguel Hernandez
Mike Barragan
Mitt Miller
Onorio Casillas
Onorio Casillas
Peter Gonzales
Santiago Marin
Westley Varga
William Rice
William Mesi

PEREZ CONSTRUCTION
Adriel Martinez
Alberto Siordia
Alexander Galindo
Allan Sanches
Andrew Silva
Angel Hernandez
Angel Perez
Brandon Beck
Carlos Gomez
Christian Gomez
Ciro Castillo
Edgar Pinedo
jason Menchaca
Javier Quiroz
Jesse Perez
Jesus Cruz
Jose Galvan
Jose Preciado
Jose Holguin
Jose Antonio-Lopez
Jose Arias
Jose Hernandez-Perez
Jose Suarez
Juan Rodriguez
Juan Carlos Parada
Juan Carlos Bello
Louie Rivera
Luis Cruz
Marco Avalos
Mario Rojas
Mario Acosta
Noah House
Omar Ruiz
Pedro Vasquez
Raul Martinez
Reinaldo Diaz
Ricardo Morales
Ricardo Ruiz
Robert Luna
Rodolfo Cruz
Rosendo Diaz
Stephen Gireer
Travis Gandara

PLAS-TAL
Alexander Reyes
Angel Gomez
Anthony Coppa
Antonio Magena
Benjamin Hernandez
Brett Devore
Charles Harris
Cody Deschamp
Daniel Pena
Daniel Vargas
Daniel Quezada
Dave Jaramillo
Douglas Knopes
Eddie Hernandez
Emilio Preciado
George Jr. Espinosa
Glenn Finch
John Martinez
John Patin
John Schmidt
Jonathan Schug
Jorge Bravo
Larry Owen
Luis Aceves
Manuel Mendoza
Mario Gonzalez
Mark Gonzalez
Mark Bell
Michael Diaz
Michael Van Ness
Mike Rutherford
Patrick Esquerra
Robert Diaz
Robert Jr., Ortega
Ruben Lomeli
Steve Samler
Travis Garner
Travis Curtis

PSOMAS
Anthony Fuentes
Ariel Arellanes
James Ramirez
Joseph Pinedo
Monty Moose
Richard Andrade
Sharon Weitzel

RAYMOND GROUP
Aaron Silva
Adrian Felix
Adriel Martinez
Aldo Garcia
Alejandro Rangel
Alejandro Castro
Alejandro Gonzalez
Alejandro Rodriguez
Alex Rodriguez
Alex Carreon
Alexander Valenton
Alexander Rodriguez
Alfredo Gonzalez
Alfredo Saldana
Anastacio Lopez
Anastacio Lopez
Angel Martinez
Angilberto Correa
Anthony Cuevas
Anthony Thomas
Anthony Corona
Anthony Ochoa
Anthony Garcia
Anthony Montano JR
Anthony Reyes
Antonio Gonzalez, III
Antonio Gaytan
Antonio Flores
Antonio Montano
Antonio Vandre
Armando Espinoza
Armondo Aguila
Arturo Holguin
Avelino Gaytan
Benito Davila
Blady Ambriz
Brad Regalbuto
Brian Medina
Brian Espinoza
Carlos Ponce
Carlos Diaz
Carlos Molina
Carlos Andrade
Casey McLean
Cesar Saldivar
Cesar Castillo
Cesar Cervantes
Chanche Willis
Chris Cardero
Clayton Viter
Daniel Olivas
Daniel Gomez
Daniel Arias
Daniel Navarro
Daniel Aguilar
Daniel Aguilar JR
Danny Lewandowski
Danny Estrada
David Medina
David Marshall
Domonique Jones
Donte Dunlap
Dylan Griffin
Eddie Seja
Edgar Sanchez
Edward Hanley
Edward Montano
Edwin Espinoza
Efrain Castro
Efrain Rendon
Elias Martinez-Cordoza
Elijah DeLuna
Eloy Duarte
Emanuel Alvarez
Enrique Chavez Jr
Enrique Holguin
Eric Westlund
eRIC Hutchins
Eric Leatherwood
Erick Solorio
Erik Valdespino
Ernesto Wilson
Ernesto Rodriguez
Ernesto Rodriguez
Erwin Melgar
Esteban Albarran
Esteban Quiroz
Ezequiel Moreno
Fausto Aguila
Felipe Noel
Felipe Morales
Felipe De Jesus Rios Jr
Felix Fanti
Fernando Vasquez
Fernando Aispirp
Fernando Perez-Clemente
Filimon Herandez
Francisco Rendon
Francisco Ramirez
Francisco Mendoza
Francisco Preciado
Frank Montero-Camacha
Freddy Johnson
Freddy Pena
Fredy MOlina
Gabriel Angulo
Gabriel Corral
Gerardo Holguin
Gerardo Bermejo
Gerardo Chavez
Gersain Garrido
Gilbert Ortega
Gilbert Ortega
Giovanni Urieta
Gonzalo Baca
Gregorio Perez
Gregory Negrete
Guillermo Saavedra
Guillermo Garcia
Gus Alamos
Gustavo Sigala
Hector Banuelos
Hector Ochoa
Hector Prado
Hector Ochoa
Heriberto Carlin
Hiram Mendez
Hugo Cuevas
Humberto Huizar
Iber Garcia
Ismael Fernandez
Ivan Hernandez
Jacient Montejo
Jack Vaughan
Jacob Galvan
Jacob Benavides
James Tuck
James Marquez
Javier Aguilar
Javier Padron
Javier Ruiz
Jay Orozco
Jerry Flores
Jerry Reyes
Jesse Muro
Jesus Rendon
Jesus Mora
Jesus Nunez
Jesus Guerra
Jesus Lopez
Jesus Barajas
Jesus Gonzales
Jesus Martinez
Jesus Lopez
Joe Chavez
Joe Prall
John Pelayo
Johnny Estrada
Johnny Urieta
Jose Espinoza
Jose Montero
Jose Nevarez
Jose Espinoza
Jose Jimenez
Jose Zayago
Jose Chavez
Jose Serrano
Jose Garcia
Jose Navarro
Jose Sanchez
Jose Garcia
Jose Zaragoza
Jose Torres
Jose Magana
Joseph Garibay
Joseph Ruiz
Joseph Lazo
Joshua Smith
Jovani Ramirez
Juan Ramirez
Juan Estrada
Juan Gomez
Juan Osorio
Juan Camacho- Perez
Juan Flores
Juan Zamora
Juan Gonzalez
Juan Estrada
Julio Monroy
Justin Leonard
Keifer Kinkaid
Kenn Price
Kevin Aguilar
Kevin Bernard
Kevyn Molina
Kii Holloway
Ladd Carlson
Lane Centanni
Larry Edwards
Leo Quiroz
Leonardo Munoz Vasquez
Leslie Card
Lorenzo Delgado
Louie Navarro
Lous Cervantes
Lovell Johnson
Ludwing Mendez
Luis Huerta
Luis Orozco
Luis Garcia
Luis Guidos
Luis Gutierrez
Luis Quiroz
Luis Lopez
Luis Rodriguez
Luis Ramos
Luke Montez
Marco Pena
Marcos Duanos
Mario Ruiz
Mario Reyes
Martin Guzman
Martin Aguila
Martin Banuenos
Martin Beltran
Mel Quiroa
Michael Licea
Michael Herandez
Michael Celone
Miguel Quiroz
Miguel Gonzales
Mike Servin
Moises Fregoso
Nathan Saucedo
Neil Alere
Noe Ambriz
Noe Godinez
Norman Cabrera
Octavio Martinez
Octavio Garcia II
Orlando Ordones
Oscar Quintanilla
Oscar Hernandez
Oscar Huizar
Pablo Gomez
Paul Castellano
Paulino Garcia
Pedro Campos
Peter Byrne
Peter Bailey
Peter Watts
Peter Bailey
Rafael Zamora
Rafael Arcos
Rafael Zamora
Rafael Arcos
Rafael Espinoza
Rafael Arcos
Randy Espinosa
Randy Centanni
Raudel Carlin
Raul Martinez
Ray Cortes
Raymond Gonzalez
Raymundo Avendano
Raymundo Lopez
Rene Montoya
Reyes Mendoza
Ricardo Alvarez
Ricardo Reyes
Ricardo Ayon
Richard Nworisa
Richard Beachman
Richard Rannis
Rigoberto Pena
Robert Nunez
Robert Beideman
Robert Lopez
Roberto Gamino
Roberto Ramirez
Roberto De Villar
Roberto De La Cruz
Roberto Nunez Jr
Roberto Gamino
Rodolfo Nuno
Rogelio Chavez
Rogelio Chavez
Ron Centanni
Ronald Contreras
Ronald Lee McVey
Ronnie Soria
Ruben Ponce
Ryan Westlund
Salvador Galeana
Salvador Perez
Salvador Quezada
Salvador Cabrera
Salvador Gutierrez
Salvador Cabrera
Sammy Perez
Samuel Ortega
Saul Gaytan
Sergio Amador
Sergio Maciel
Sergio DIaz
Sergio Huizar
Silva Aurelio
Silvano Juarez
Terence Oliver
Thomas Hammaug
Tony Gonzales
Travis Winsor
Ulysses Hawkins
Uriel, Jorge Orozco
Victor Fuentes
Victor Soto
Victor Aguliar
Victor Cardiel
William Ramos

REGAL
Arthur Williams JR
Carlos Barragan
Charlemane Pascual
Daivd Leach
Dana Baudoin
George Flores
Jaime Chavarin
Miguel Nunez
Omar Romero
Rene Romo
Ruben Maldenado
Tan Huyna

RELIABLE/BIGGIE
Adam Ramirez
Adam Wojcik
Blake Hightower
Brian Olenslager
Burt D. King
Craig Meyer
Daniel Mullican
Devin Gregory
Donnie Tremper
Eddie Orton
Eric Skasick
Fred Houck
Grant Woodward
James Kelley
Jason Gillespie
Jason Hite
Jeff McAndrews
Joe Cornish
Joe Ramirez
John Taafee
Johnny Gardner
Joseph Aguilar
Joseph Deitrick
Josh Foley
Josh R. Wiggins
Keith Anfuro
Keith Bryant
Kenneth Jones
Marco A. Chavez
Marco A. Chavez
Mark Walker
Michael Loprinzi
Michael Beck
Peter Wantland
Randy Mercer
Robert Tipton
Robert Oliver
Robert Jeffers
Ronnie Airhart
Ross Ginn
Ryan Townsend
Stephen Walborn
Stephen Brandstrom
Tommy Goodwin
Travis Berry
Vinny Lewis

RELM
Anthony Bertolini
Chad Krenzke
Darren Shirai
Jen Packer
Scott Baker
Tony Lopez

ROSENDIN ELECTRIC
Aaron Whitten
Adrian Ramirez
Aharown Jackson
Alberto Jr. Prado
Alberto Jr. Rascom
Alejandra Chavez
Alejandro Ramirez
Alexander Potasi
Alfred Gomez
Alfredo Iniguez
Alfredo Ramos
Andres Lopez
Angel Torres
Anthony Galasso
Anthony Toledo
Antonio Munoz
Armando Ramos
Art Salazar
Arthur Acosta
Artur Jagoda
Avo Missakian
Benjamin Rubalcava
Benjamin Soria
Bernardo Lutt
Boud Hollingworth
Brian Petersen
Brian Smith
Brian Chung
Camron Clay
Carlos Ramirez-Maritnez
Chad Bowman
Chee Kwan
Christian Espinoza
Christian A. Gutierrez
Christopher Herrera
Christopher Schulze
Christopher Weister
Collette Reynolds
Craig Hoback
Curtis Tong
Daniel Brach
Daniel Siqueros
Danilo Vispo
David Lewis
David Vallejo
David Pantoja
David Atkinson
David Elliott
Dennis Sanderson
Dimitrus Mitchell
Douglas Pointon
Duncan MacLead
Edward Alonzo
Edwin Johnson
Elijah Samuel
Emilio Coblentz
Emmanuel Soriano
Eric Perez
Eric Hacock
Erick Figueroa
Ernesto Salon
Esaul Galvez
Etuate Vaki
Felix Antonio Mejia
Fernando Aragon
Fidel Diaz
Fidel Lopez
Fred Aguilar
Fred Aguilar
Gabriel Zuniga
Garibay Esteban
Gaspar Gharapetian
George Jeries
Geovanni Adan
Geovanny Castro
Glenn Bunn
Gorki Mejia
Grant Anderson
Hector Loza
Henry Ramirez
Ian Escobar
Ian Morones
Isaac Castro
Isaul Vargas
James Teasure
James Salazar
James Shaw
Jason Rubalcava
Jason Montoya
Jason Meeks
Jason Zigler
Jason Sanchez
Javier Martin
Jeffery Nelson
Jeremias Davis
Jeremy Ryan
Jesus Acosta
Jesus Valdez
Jesus Aranda
Joe Romero
Joe Rangel
Joel Greenfield
John L. Franklin
Johnny Ayala
Johnny Reyes
Johnny Monk
Jonathan Valencia
Jonathan Morales
Jonathan Baker
Jonathan Stacy
Jonathan Swick
Jonika Ingram
Jorge Vazquez
Jorge Anguiano
Jose Barbarin
Jose Cervantes
Jose Rosas Alamilla
Jose Jimenez
Jose Siordia
Jose Siordia
Jose Anya
Jose Arrieta
Jose Canongo
Jose Eduardo Figueroa
Joseph Garganus
Josh Puckett
Joshua Marmolejo
Joshua Mandeville
Joshua Anderson
Josue Zamora
Juan Ramirez
Juan Gonzalez
Juan Fang
Julio Ochoa
Justin Reyes
Kainalu Cuico
Karl Mendoza
Kenneth Yaeger
Kenneth Castaneda
Kevin King
Lance Denning
Lawrence Fung
Lee Hennum
Lee Ngo
Luis Gabriel
Luis Pena
Maleek Trice
Marco Foschetti
Mario Iribe
Mario Hidalgo
Mark Borja
Martin Cervantes
Mathew Munoz
Mathew Apker
Mathew Johnson
Michael Marcelin
Miguel Gutierrez
Mike Galasso
Nicholas Seymour
Nicholas Timas
Nigel Moran
Noe Medina
Noel Serrano
Omar Magana
Otto Rene Mayen
Paul Pistone
Paul Reyes
Phillip M. Roberts
Phillip M. Roberts
Quincey Morton
Rafael Valadez
Ralph Gomel
Raul Mejia
Ray De La Luz
Raymond Wood
Raymond Buhlmann
Rene Perales
Ricardo Rodriguez
Ricardo Lomas
Ricardo Nunez
Ricardo Gutierrez
Roberto Ceja
Roberto Lutt
Robin DeLeon
Ronald Burrows, II
Ronald Graham
Ruben Reyes
Ruben Santiago
Ryan Harris
Ryan Davis
Ryan Welling
Saheed Inawo
Salvador Mandujano
Salvador Serrano
Salvador Rothenhausler
Sam Wallace
San Sok
Saul Rincon
Scott Lockwood
Scott Martin
Scott F. Bylander
Sean Kelly
Sean Taylor
Sergio Lopez
Sergio Correa
Shawki Ingram
Silverio Rodriguez
Steve Gordon
Steve Ton
Steve Hwang
Tim McArdle
Tim Demoor
Todd Pa'ala
Tom Alexander
Vicente Rodriguez
Victor Gonzalez
Vincent Hernandez
Walter Britton
William Preston
William Serrano
William Zungia
Wily Ardon
Xavier Kennedy
Yvonne Rojo

ROUSE COMPANY
Adam Laskey
Alvaro Leon
Andrew Prado
Andrew Ramirez
Angel Sanchez
Angelita Martinez
Anthony Ramirez
Art Jimenez
Carlos Munoz
Christopher Flores
Damian Guzman
Daniel Donaldson
Daniel Romero
Daniel Slattery
Daniel Martin
Daniel Perez
Danny Cabrera
David Reynosa
David Valdez
Donald Cardiel
Dustin Ramos
Edward Becerril
Enrique Rodriguez
Eric Valdez
Felix Lopez Jr
Gary Garcia
Geoff Milligan
Gustavo Ortega
Gustavo Trevino
Hugo Hernandez
Issac Aguna
Jesus Rojas
Jimmy Patton
Joel Castro
Joel Bearup
John Rich
John Long
John Martin
John Long Jr
John Long Jr
Jorge Herrera
Jose Hidalgo
Jose Trevino
Jose Esquivel
Juan Preciado
Juan Garcia
Justin Torres
Ken Gates JR
Luis Godinez
Luis Rico
Luis Ramos
Luis Viramontes
Mackario Andrade
Manuel Estrada
Mario Gonzalez
Mario Perez
Martin Bustamante
Michael Abeyta
Miguel Mercado
Nicholas Griffin
Nick Carrasco
Oliver Maya
Omar Rico
Oscar corona
Oscar German
Oscar Gonzalez
Patrick Thomas
Paul Rodriguez
Randall Papp
Randy Fernandez
Raymond Garcia
Rick Harvey
Robert Gomez
Robert Herrrera
Roberto ROmero
Rodolfo Ramirez
Ronald Rummel
Ruben Miramontes
Ruben Padilla
Salvador Ramos
Samuel Anguiano
Skylar Sloan
Steven Valdez
Steven Tolman
Thomas Richardson
Vicent Trevino
Vicente Barellano
Victor Rojas
Vincent Prado
Walter Patrick

RPG
Aaron Bell
Brett Fernandez
Brian Seeley
Brian Calderon
Facundo Gonzalez
Henry Navarro
Jesus Miguel Chavez-Rodriguez
Jorge Lopez
Justin Cline
Luis Calderon
Obdulio Castellon
Raymundo Arellano
Tim Cline
Antonio Navarro
Chris Torrance
David Gamboa
Efren Esparza
Greg Salcido
Jimmy Rheinschild
Jose Gaudique
Luis Flores-Sanchez
Mike Luna
Phillip Brun
Rafael Torres
Rafael Ramirez
Rene Vera
Sergio Chamorro
Victor Hluz

RWDI
Adriana Costa
Aimee Smith
Albert Brooks
Brenda Lutz
Bryce Lang
Cory Paine
Frank Kriksic
Gary Stone
Greg Austin
Jaime Fischer
Jan Dale
Jason Garber
Jerry Oliver
Joe Valeriote
John Cui
Josh Ward
Katie Reipas
Michael Pieterse
Mike Craig
Mike Soligo
Nigel Rostance
Norma Woods
Priya Patel
Rafael Flores
Stan Parnell
Stefany Piovesan
Tracy Biffis
William Yakymyk

SAFWAY
Agustin Garcia
Armando Perez
Arnold Lopez
Arturo Toro
Arturo Toro
Daniel Cruz
Edward R. Long
Edwin Garibay
Efran Castro
Fernando Preciado
Gilbert Armendariz
Gustavo Gonzalez
Gutavo Martinez
Hector Serrano
Ivan Torres
Jeffrey Renteria
Jesse Villa
Joas Perez-Torres
Jorge Gonzalez
Jose Barajas
Jose Martinez
Jose Molina
Jose Talavera
Joseph J. Comeaux
Juan Rizo
Juan O. Vargas
Julio Preciado
Kevin Wopershall
Luis Garcia
Luis Garcia
Marco Loera
Mario De LaCruz
Mike Smith
Pierre Romo
Rene Avelar
Ricardo Zambrano
Steve Schaeffer
Tom Stibbie
Tracy Isaac

SCHUFF STEEL
Abel Herrera
Adam Ramirez
Adam Ramirez
Alan Naranjo
Alan Salazar
Alejandro Sanchez
Andrew Blunt
Andrew Reavis
Andrew Ramirez
Andrew Gonzalez
Anthony Hannan
Austin Ahrens
Avery Steel
Bacilio A. Henera
Brent West
Brito Francisco
Caelan Bunt
Caleb Spain
Cam Patterson
Carlos Del Barco
Carlos Sanchez-Pleites
Carlos Alvarez, Jr.
Chad Ambrose
Cheryl Thomas
Cheyne mascarenas
Chris Chapon
Christian Rosby
Christopher Ahrens
Christopher Brewer
Chuck Zillner
Cody Elliott
Craig (Stan) Castor
Dane McNair
Daniel Gomez
Daniel Novak
Daniel
Daniel Garcia
David Walters
David Glover
David Kennedy
Derick Shannon
Dwayne King
Ed Lowe
Eddie Rivera
Eddie Lopez
Edward Stedham
Erwin O. Torres
Fernando Alcoser
Fred Garza
Fred Powell
Gabriel Ruiz
George Harris
George Brown
Gerald Mason
Gregory Orozco
Guy Hill
Hector Gonzalez
Henry Short
Ian Vergiels
Jaime Gomez
James Rutledge
James Williams
Jared Velasco
Jeremiah Thomas
Jerry Gandara
Jesse Flores
Jesus Palomino
Jesus Cosberas
Jody Gonzales
Joe Franske
Joel Bocanegra
John Morris
Johnny Vivian
Johnny Roybal
Jonathan Nieto
Jordan Diaz
Jorge A. Torres
Jose Rivas
Jose Ortiz
Jose C. Rodriguez
Jose Felipe Alvarado
Joseph Tolman
Joseph Cordero
Joseph Asturino
Joshua Novak
Juan Soto
Justin Trayford
Kevin Dickson
Keylor Quinonez
Kyle Negrete
Lon Steel
Louis Neal
Marco A. Herrera
Marcos Moran
Mark Harrison
Mark Lazarz
Mark HIll
Mark Delery
Martin Johnson
Martin Bruno
Michael Jimenez
Michael Anderson
Michael Forster
Michael Hoyo
Michael Lemon
Miguel Saucedo
Ngoan Le
Omar Hertado
Omar H. Palomino
Oscar (ED) Alfaro
Pablo Camarillo
Patrick Bolden
Paul Pearse
Paul Graham
Phi Ung
Raini Day
Ramon Martinez
Randy Rodriguez
Rene Menendez
Richard Anderson
Richard Alvarez
Richard Robledo
Richard Cavriani
Richard Kiser
Robert Diaz
Robert Mansfield
Roger Ramirez
Rosario (Gino) Catania
Ruben Lomeli
Sal Mora
Sam Maracle
Samuel Howard
Saul Vasquez
Scott Butler
Sergio Trejo
Shad Tretheway
Snaider Cabrera-Alvarado
Sonny Lopez
Stephen Brandstrom
Stephen Pokryska
Steve Meyers
Terry Lee Lowry
Tim Walswick
Trinidad Preciado
Vicente Pineda
Vicente Campos
William Lopez
Zeferino A. Sanchez, Jr.

SELBERT PERKINS DESIGN
Carl Crooks
Cheri Devlin
Edgar Godoy
Jonny Peterson
Robin Perkins
Brian Kuhn
Kevin LaMalva
Matt Yin
Nathan "Nate" Wittasek
Ozzie Mercado

SITE SAFETY
Daniel Garay
David Garay
Eduardo Michel
Kelvin Williams
Kevin Sterling
Siranush Martirosyan

SKY-RIDER
Alejandro Villasenor
Alejandro Yebra
Ali Zereh Nazi
Anthony Diaz
Cesar Rey Luna
Devin Wilson
Diono Romero
Ed"Jose Salac
Gema Hernandez
Gene Schwab
Isidro Juan Garcia
Jaime Lizarraga
Jesse Padilla
Jose Cruz
Jose Rosas Cruz
Jose Villegas
Juan Laughlin
Larry Berbude
Mario Rubio
Michael Eaton
Philip Villegas
Placido Gonzalez
Ramon Bernal
Rebecca Escobar
Theodore Grewford
Victor Rosas
William Charleston

SMG MARBLE
Abel Vasquez
Abel Vasquez
Abraham Gonzalez
Adrian Hernandez
Alberto Ramirez
Aldo Maldonado
Alejandro Esquivel
Alejandro Flores
Alexander Calderon
Alfredo Lopez
Andres Raygoza
Andrew Solorzano
Andy Gerber
Angel Barajas Mata
Anthony Martinez Jr
Anthony Logan
Arnulfo Soria
Arturo Ruiz
Bernardo Mendez
Boris Fabian
Braulio Fuentes
Camiar Ghojeh
Carlos Morales-Velazquez
Carlos Pinedo
Carlos Umana
Carlos Salazar
Carlos Pahua
Cesar Lima
Chad Johnson
Chris Priore
Cruz Garduno
Daniel Martinez
Daniel Luna jr
Danny Rebamonte
David Chadwick
Delfino Sanchez
Diego Garcia
Edel Soto
Eduardo Soto
Eduuijes Escareno
Efrain Quintero
Efrain Lopez
Efren Martinez
Eloy Bernal
Elpidio Alvarez
Enrique Villa
Erick Valdez
Ernesto Flores
Esteban Contreras
Eusebio Santana
Faustino Fausto
Felipe Bernal
Fernando Rodriguez
Fernando Herrera
Fidel Vargas
Francisco Orellana
Frank Renteria
Frank Rodriguez
Gabriel Flores
Gaston Guillen
Geovanny Huerta
Gerardo Valadez
Gerardo Valadez
German Garcia
Gonzalo Luna
Greg Keaslin
Greg Mi-Intrye
Gustavo Alvarez
Hugo Gutierrez
Hugo Perez
Humberto Lopez
Humberto Macias
Ignacio Sanchez
Isidro Pumatz
Jack FLores
Jaime Garcia
Jame Sweeney
James Young
Jason Tallman
Jesus Orellana
Jesus Ramirez
Joaquin Sandoval
Joe Rizzen
Joel Monreal
Jorge Escaneno
Jorge Acosta
Jose Enciso
Jose Enciso
Jose Murillo
Jose Licea
Jose Flores
Jose Soto
Jose Valle
Jose Antonio Delgado
Jose Luis Guido
Jose Y Rivas
Joseph Llanes
Joshua Hildreth
Kamron Jones
Kelly Danaher
Kevin Clark
Larry Perez
Leoncio Franco
Luis Perez
Luis Arellano
Luis Soto
Manuel Hertado
Manuel Fernandez
Manuel Fernandez
Manuel Dorantes
Manuel Valle
Mario De La Vega
Mark Cawley
Martin Moreno
Mauro Munoz
Miguel Amaro
Miguel Vidals
Nelson Melgar
Nelson Vasquez
Nelson Rosales
Nicholas Lopez
Oscar Hernandez
Patrick Joynt
Patrick Doran
Pavel Garcia
Pedro Jimenez
Peter Lopez
Rafael
Ramon De La Rosa
Ramon Chavez
Ramon ROdriguez
Raul Vaasquez
Rene Chavez
Reyner Flores
Reyner Flores
Ricardo Chavez
Richie Maragliano
Ricki Vasquez
Robert Estrada
Robert Fernandez
Rodrigo Diaz
Ron Estes
Ronnie Henderson
Ronnie Massey
Roy Aviles
Ruben Queada
Rudolph Espinoza
Ruel Ditoro
Salvador Verduzco
Salvador Luna
Seferino Mendez
Silvio Echemenda
Stephen Jaques
Steve Fierro
Tony Gonzalez
William Gonzalez
William McKettrick
William Guevarva

SO. CAL INSULATION
Adolfo Delgado
Albert (David) Nicholson
Antonio Salazar
Bobby Griego
Bryan Rangel
Christopher Hernandez
David Donovan
David Carey
Eric Soto
Florentino Gonzalez
Joel Serrano
Joey Gonzalez
John Tosti
Jose Yepez
Kyle Knight
Paul Martinez
Ruben Morales

SOUTH COAST SPECIALTY
Cade Walsh
Cristian Silis
Daniel Jara
Greg Topp
Jose Perez
Jose Bobadilla
Josjua Maize
Juan Serrano
Lionel Ruiz
Ramiro Oliveros
Richard Harp
Richard Serrano
Tom Oltman

SPECIALTY STAINLESS INSTALLATION
Angel Garcia
Daniel Villalobos
Erasmo Barra
James Hughes
Jason Baucher
Jose Chavez
Joseph Rico
Justin Brown
Justin Brown
Osmar Ibarra
Wayne White
Will Ziegenmeyer

STANDARD DRYWALL
Abel Diaz
Abel Salcedo
Adan Vega
Alberto Garcia
Alex Rodriguez
Alvaro Avelar
Andre Speese
Andre Miles
Andrew Ariaz
Anthony Paz
Antonio Johnson
Antonio Rivera
Antonio Rodriguez
Antonio Gonzalez
Arnold Quitero
Art Cervantes
Aurelian Reyes
Aurelio Lopez
Ausencio Sandoval
Austin Hendricks
Bloas Altamirano
Bobby Johnson
Brad Gwinn
Brian Parisi
Brian Fluery
Bruno Rojas
Bryan Huerta
Bryan Lopez
Carlos Regalado
Carlos Lizama
Chester Leal
Cheyvonne Grayson
Chris Lemieux
Chris Smith
Chris Corday
Chris Anderson
Christopher Lopez
Ciro Castillo
Connor Multon
Corey Spaise
Curtis March
Daniel Guerrero
Daniel Cruz
Daniel Paoletti
Darnell Lowe
Darryl Digges
Darryl Lockett
David Corona
David Eulloque
Derek Warrick
Dustin Jeffers
Dylan Birchfield
Earl Richardson Jr.
Earl Richardson III
Eduardo Zamarron
Epitacio Mendoza
Ernesto Chavez
Esteban Tello Vega
Fausto Auilgar
Felix Gonzales
Francisco Contreras
Francisco Olivan
Francisco Guerrero
Gabriel Pena
Gabriel Oyoque Solano
Garrett Greer
Garrett Welty
Gerald Moore
German Juarez
Gilberto Benitez
Gilberto Avila
Greg Drumm
Hector Lopez
Hugo Ramos
Imari Conway
Ivan Escudero
Jaime Marcial
Jamar Davis
James Hart
James Berry
Jeff Miederhoff
Jerson Lopez
Jesus Nava
Jesus Hernandez
Jesus Saldivar
Joel Cervantes
John Cordray
John Pelayo
Johnathan Young
Jorge Salazar
Jorge Heras
Jose Toxqui
Jose Castro
Jose Bravo
Jose Morales
Jose Juarez
Josh VanBlankenship
Josue Rodriguez
Juan Torres
Juan Delayo
Juan Talavera
Juan Vega
Juan Contreras
Juan Ugalde
Justin Gonzales
Justin Flores
Karl Nickoley
Kelvin Glass
Kevin Greer
Kevin Bernard
Kevin Lee
Kevin Barner
Kim Cordova
Kyle McShare
Lamont Richardson
Leo Jimenez
Lorenzo Vasquez
Ludwig Mendez
Luis Salas
Luis Cervantes
Manuel Robledo
Manuel Munoz
Marco Cervantes
Marco Anguiano
Marco Andrade
Margarito Albavera
Mario Montenegan
Mark Steiner
Mark S. Louk
Martin Gonzalez
Mathew Medina
Mathew Lemieux
Maximliano Garcia
Maya Bartur
Michael Sykes
Michael Ramirez
Mickey O'Neall
Mickey Braun
Miguel De LaCruz
Miguel Rojas
Mike Kirkpatrick
Mohamed Amouri
Monty Vickrey
Nathaniel Berry
Nicholas perez
Norman Eckles
Norman Eckles
Octavio Soto
Omar Perez
Omar Carlos
Omar Salazar
Oscar Martin
Oscar Martin
Oscar Contreras
Osvaldo Barajas
Patrick Bannister
Paul Masi
Paul Perez
Rafael Cervantes
Rafael Alonzo
Rahim Kendrick
Randall Haase
Randy Morris
Raul Cristobal
Raul Martinez
Ray Vasquez
Remy Conteras
Reymundo Ceja
Ricardo Ramirez
Ricardo Hernandez
Ricardo Cartagenca
Ricardo Bolanos
Robert Sanchez
Robert Solorzano
Robert Sherwood
Roberto Molina
Ron Vickrey
Sabas Mariscal
Salvador Gutierrez
Salvador Zamora
Salvador Whalen
Steve Lozano
Steve Meiderhoff
Steven Wren
Steven Ranta
Steven Rubalcava
Ted Adamson
Thomas Schmitt
Thomas Vickrey
Thomas Jimenez
Thuy Nguyen
Timothy Schutz
Tommy Andrade
Tony Perri
Travis Dickson
Tyler Neal
Victor Lopez
Victor Lopez
Victor Otter
Wayne Hilton
Zachary S., Miederhoff

STANDARD VISION
Adrian Velicescu
Alberto Garcia
Asmik Sarkisyan
Brad Gwinn
Brian Parisi
Derek Warrick
Ethan Ma
Ethan Coco
HS Moon
Isaiah Montoya
James Hart
Jeffers Egan
Jeremiah Montoya
Jesus Nava
Josh Van Blankenship
Katie Slaughter
Kevin Bartanian
Mark Escibano
Martin Gonzalez
Maya Bartur
Maysam Ghaffari
Michael Sykes
Nathan Spect
Oscar Martin
Ralph Nadeau
Raul Cristobal
Renay Pratt
Sinziana Velicescu
Steve Ranta
Steven Wren
Sylva Harutyunyan
Thimio Soto
Thomas Schmitt

STO DESIGN GROUP
Ken McPhie
Mariela Bautista
Victor Castro

SUNBELT ELECTRIC
Aaron Search
Anthony Galvan
Au (Ken) Trinh
Benedicto Castro
Bruce Misch
Byron Balsells
Cornelius Kroon
Earl Tunnell
Feliks
Floyd Shaw
Fulgencio Marquez
Henry Contreras
Hung Tran
James Newton
Jesse Sanchez
John Barber
Jose Castillo
Justin Quenga
Lawrence Diaz
Mathew McCarson
Michael Portillo
Paul Freeman
Ray Mendoza
Ronnie Daddio
Scott Roberts
Sean Erickson
Sheron Arzu

TANGRAM FLOORING
Alonso Curiel
Andres Medina
Angel Morales
Angel Gudino
Antonio Rodriguez
Arturo Acuna Jr
Augustine Rodriguez
Augusto Gamboa
Benjamin Cuenca
Carlos Rodriguez
Carlos Chavez
David Teper
Edgar Velasco-Vallin
Efrain Meza
Erik Mojica
Ever Rodriguez
Gilberto Palacios
Jeremy Manuel
Jesus Flores
Joe Sandoval
Jorge Garcia
Jorge Anguiano
Jose Villa
Julio Hernandez
Kevin Medina
Luis Carbajal
Luis Gallegos
Luis Partida
Marcelino Mendoza
Mario Reyes
Miguel Velasco
Oscar Medina Jr
Richard Jaime
Rigoberto Tapia
Roberto Medina
Samuel Venegas
Silvestre Menera
Thomas Sanchez

TERRA-PETRA
Alvaro Arellano
Andrew Alvarran
Daniel Valdez
David Akers
Diego Sauceda
Eduardo Rangel
Efrain Torres
Fernando Monay
Hector Flores
Jake Gallo
Jesus Mora
John Conaway
Josh Heidt
Justin Conaway
Raul Ramirez
Ricardo Sanchez
Richard McClanahan

THE GREEN DINOSAUR, INC.
Bing Guerin
Chih-Jen (Tomo) Cheng
Emily Greenstreet
James Powell
Jason Lorcher
Justine Mouron
Melanie Onnen
Shane Hansen
Travis Sage

THORNTON TOMASETTI
Benjamin Howes
Bruce Gibbons
Chelsea Kemmerrer
Chuan Do
Claudia Bruder
David Flores
Eric Gargiulo
Jonatan Schumacher
Justin Schwaiger
Kerem Gulec
Leonard Joseph
Michael Bauer
Montri Dechpormsuk
Ola Johansson
Stephan Eisenreich
Thomas Weir

TRADEMARK CONCRETE
Adalberto Gomez
Alejandro Martinez
Amanio Gomez
Andrew Ryserson
Carelton Emerson
Carlos Rodriguez
Carlos Velasco
Chris Wolf
Chris Cannon
Daniel Calzada
David Stevenson
David Calzada
David Arroyo
David Zubiate
David Castellanos
DeShawn Larkin
Edward Savedra
Enrique Vargas
Ezequiel Villanueva
Feliz P. Gomez
Florentino Pulido
Gilberto Ruiz
Glen Sutherland
Gregori Abundio
Hector Valle
Hector Gonzalez
Ismael Acevedo
Javier Rodriguez
Jesse Cisneros Jr
Jesus Rivera
Joaqiuin Castillo
Jose Gonzales
Jose Ramos
Jose Barragan
Jose Oscar Romo
Joseph Gravning
Juan Carlos Caudillo
Juan Carlos Ornela
Kevin Allen
Kirk Gunning
Kyle Boyer
Luis Garcia
Manuel Seguna
Marcelino Gomez
Marcelino Gomez
Marcos Ramirez
Marcos Sema
Marcos Verdin
Martin Murillo
Martin Murillo
Martin Villalpando
Martin Victoriano
Mauricio Garcia
Miguel Hernandez
Miguel Castellanos
Miguel Macias
Miguel Castellanos
Moctezuma Meza
Paul Barragan
Rigoberto Adame
Roberto Gonzalez
Rogelio Cruz
Ruben Castellanos
Rufino Flores
Savladro Aguilar- Vences
Sergio Gonzales
Silvano Gulierrez
Victor Pulido
Victor Barragan

TRAXX
Albert Hernandez
Charles Lowe
Darrell Carmouche
Felipe Meza
Guadalupe Alvarez
Jose Martinez
Julio Salcedo
Marquis Patterson
Michael Lowe
Miguel Santizo

TURNER
Abner Estrada
Alex Montoya
Allen Chow
Alvaro Giron
Andrew Rosenberg
Andrew Petronakis
Arturo Diaz
Ben Tajik
Ben Nobakht
Bernard Miranda
Billy DePasquale
Blanca Diaz
Brandon Burr
Brendan Murphy
Brian Poage
Christina Alvarado
Cole Ulanoski
Crystal Ho
Dan Dorn
Daniel Sistrunk
Dave Bushnell
Dennis Orchard
Dennis Kim
Didith Uy
Dustin House
Edgar Sanchez
Fausto Hernandez
Gar Manalastas
Gavin Banks
James McLaughlin
Jared Posvistak
Jason Jones
Jeff Baker
Jennifer Johnson
Jessie McCourt
John Stoian
John Raitt
Jonathan Crabill
Jordan Kath
Jose Alday
Joseph Pobanz
Juan Hernandez
Karen Urosa
Keith/Kerwin Booker
Kurt Tashiro
Lisa Verzemnieks
Lorrac Craig
Marc Turcot
Matthew Vallejo
Matthew Imber
Michael Marchesano
Michael Kozel
Mohammad Kahn
Nick Pettengill
Paul Dempsey
Peter Davidson
Rachel Ibrahaim-Watkins
Rick Dockins
Ryan Priest
Sam Hernandez
Scott Holmstrom
Shawna Brierly
Steve Damaso
Vesna Conroy
Wendy Yu
Will Chehayeb
Yvonnne Marchand

USA HOIST
Anthony Santana
Brian Carruters
Celeste Campbell
Christian Galvez
David Shragg
Eduardo Pacheo
Edward E. Reyes
Eloy Felix
Eric Maynard
Eric Dycus
Eric Madrigal
Ernie Marques
Francisco Tapia
Fred Borowiel
Gabe Hernandez
Gage Pinion
George Servantes
Gilbert Mendoza
Gillis Leonard (Lenny)
Glenn Bunn
Goizlermo Rodriguez
Guy Smith
Hugo Chavez
James Wachter, Sr.
James Thompson
James R. Butner
Jeff McAndrew
Jeffrey Chandler
John White
Jonas Garvin
Jose Contreras
Jose Angulo
Jospeh Mcafee
Juan Martinez
Kenneth Jones
Manuel Quiroz
Mark Mendonca
Mark Starvis
Mathew Wharton
Matt Stone
Michael Hollingsworth
Michael Mitchel
Miguel Curiel
Norma Alvidrez
Paul Darlin
Ray Esqueda
Rene Palacios
Richard Heitzman
Richard Bowden
Ricky Harrison
Robert Martinez
Robert Butner
Robert Jefferis
Rodrigo Mendoza
Ruben Sanchez
Ryan Brown
Stephen Wenniger
Steve Rojas
Todd Jeffers
Tuttle AB
Wanda Lanier
Will Jameson
William E. Jeffers

VENEKLASEN ASSOCIATES
Angel Murillo
Cathleen Novak
Elena Carvajal
Jack Shimizu
Jerry Christoff
Jesus Bolivar
John Zeman
John LoVerde
Menandro Domingo
Pablo Amezquita
Richard Silva
Samantha Rawlings

WASHINGTON IRON
Albert (David) Nicholson
Andrew Aceves
Andrew Blunt
Ara Aghayans
Audres Valdivia
Bill Robertson
Brandon Harris
Brandon Martin
Brandon Brown
Bret Ossko
Brian Goods
Brian Percell
Cameron Deschamp
Carlos Lopez
Carlos Morales
Chad Leuschner
Clive Currie
Craig Morrison
Damon Hess
Daniel Garcia
Daniel Chavez
Dave Martin
David Selznick
Donald Stidham
Drew Castro
Dustin Shope
Enrique Paredes
Eric Ramirez
Eric Ramirez
Farju Samual Sarkisian
Felecia Culpepper
Fernando Valdez
Francisco Pavedez
Francisco Montoya
Gabriel Miranda
Gerald Sowers
Gonzalo Flores
Hilario Manuel Liane
Ignacio Nava
Jack Bills
James Cervantes
James Leonard
James Birkes
Jeff French
Jeffrey Bree
Jesse Flores
Joel Nava
John Gonzalez
John Gianone
Johnny Riley
Jorge Bejaranu
Jorge Bejarano
Jorge S. Marquez
Jose Reyes
Jose Rivera
Joseph Lopez
Juan C. Lara
Kevin Macias
Lolesio Lito
Mark O'Donell
Mark L. Brockus
Marques Jorge
Martin Maldonado Cayo
Melvin Romero
Michael Wood
Michael Guzman
Miguel Manriquez
Miguel A. Ramirez
Miguel A. Castellano
Nathan Hilban
Nicholas Besteiro
Patrick Vilte
Paul Loomer
Preston Barton
Randy Rodriguez
Richard Brinnan
Roberto Salazar
Ron Viveros
Salvador Zavala
Saul Vasquez
Scotty Allee
Sergio Gomez
Steven Davis
Steven Cruz
Thai Pham
Tracy Keller
Victor Cisneros
Wesley Castellano

WESTCOAST FIRESTOPPING
Alejandro Penaloca
Armando Flores
Christopher Slayer
Cruz Joe
Fernando Rodriguez
Greg Simpson
Gustavo Mireles
Israel Rivera
Jaime Villanueva
Loren Giles
Manuel Higuera
Marco Rodriguez
Michael Ramos
Michael Rysdon
Miguel Olivares
Miguel Carranza
Rafael Olvera
Richard Andrade
Robert Cruz
Robert Gutierrez
Ronald Canales
Tolentino Martinez
William Rodriguez
Zack McGonigle

WILSON ASSOCIATES
Alter Burston
Chelsea Kitchens
Cheryl Neumann
Evelyn Lee
Fumiko Shiga
Gary Broeker
Hussain Kamal
Jerry Beale
Jessica Houlemard
Kumiko Matsuda
Pranav Sinha

WINEGARDNER
Brad Taylor
Cesar Perera
Daniel Olinger
Daniel Gonzales
David Perez
Dennis Bartholomay
Dennis Castonguay
Donald Johnson
Donald Parris
Gilberto Lopez
Humberto Vargas
Jeff Reinke
Jeffrey Heitz
Jesus Martinez
Joel Martinez
Jose Morales
Jose Martinez
Jose M. Carrillo
Joseph Martin
Joseph J. Prieto III
Juan Carlos Contreras
Larry Skadsem
Leobardo Ruvalcaba
Leonardo Ruvalcaba
Michael Sanchez
Nicolas Haynes
Orlando Ayon
Oscar Garita
Rick Winkles
William Gonzalez

XL FIRE
Austin Justrich
Benny Barba
Brandon Lopez
David Valle
Elvis Galindo
Fabian Caldera
Fernando Zepeda
Francisco D. Gonzalez, III
Gary Lish
Graig Norwood
Ismael Mondragon
Jerry Hernandez
Jimmy Mendoza
Jose Hernandez
Joseph Sonnenberg
Joseph Hawkins
Joseph Hawkins
Juan Jauregui
Justin Walters
Kyle Kerr
Manuel Ayala
Marco Arroyo
Mark Hanna
Mark Rooney
Michael Hopper
Mike Folch
Nickalus Marlowe
Octavio Almada
Octavio Flores
Oscar Campos
Rene Mendez
Richard Acevedo
Robert C Cruz
Salvador Alonzo
Stephan Guerra
Terry lee
Todd Perkins
Vahe Tovmasyan
Victor Paredes
Victor Magana

WILSHIRE GRAND THE RISE OF A NEW SKYLINE

THE FIRST, BIG STEP

[**Foundation,** from S10]
sort in Rancho Palos Verdes.

Above his desk, he keeps a photograph from one of his first jobs, almost 25 years ago.

Back to the camera, he stands looking at a two-story tilt-up that has just been raised in Fountain Valley, the prefab concrete wall held up with braces. "I'll never forget that moment," he said.

In the Turner offices in 2014, schematic drawings and cross-sections of the skyscraper were hung next to sketches scribbled on walls in erasable ink. Overhead, a banner read, "Communication promotes progress," words borrowed from Rick Warren, pastor of Saddleback Church in Orange County, where Marchesano lives.

Momentum was critical, Marchesano said, for a building whose budget was once set at $1 billion and had already risen by $750,000. Time was money for the owner of the property, Korean Air, whose parent company, Hanjin Group, is chaired by Yang Ho Cho.

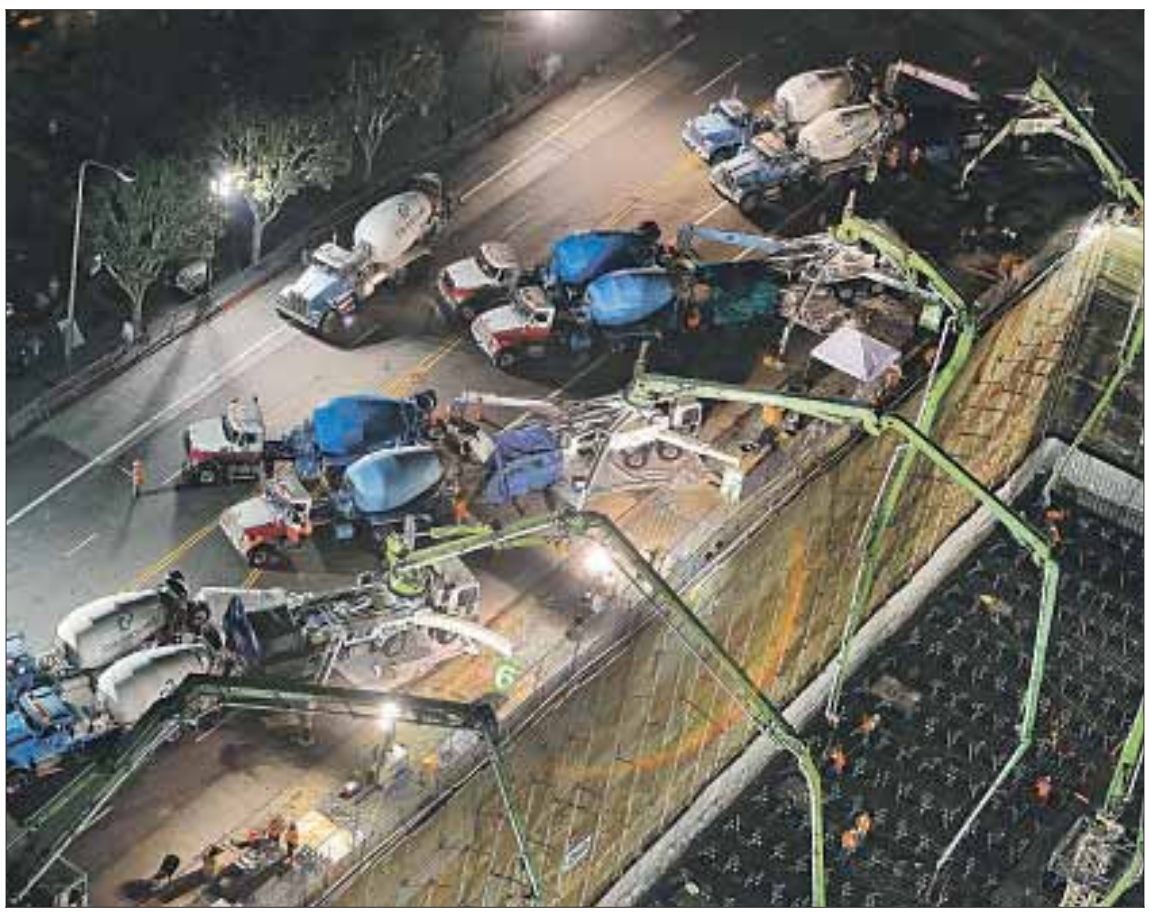
First came dismantling the old Wilshire Grand piece by piece, followed by hauling away about 250 truckloads of dirt each night for nearly six months. Then Marchesano had to make sure that the pour was even possible.

He penciled out the constraints.

For one, the concrete had to be laid within 90 minutes of being mixed; otherwise it would begin to set and not meet the requirements for the job. Also, the work had to be completed in less than three shifts; otherwise the truck drivers would violate federal regulations and exceed their allowable 15 hours on the road.

As Marchesano did the math, he wondered if the site had room for the pumps needed to ferry the concrete from mixing trucks into the pit. He turned to the computer geeks down the hall, wizards at plotting and spinning in cyberspace the footprint of the construction site and the surrounding streets.

They found room for 19, more than enough, and calculated their placement, each within a foot. Anything out of alignment, and Marchesano would have a safety hazard and traffic jam on his hands.



Photographs by MEL MELCON Los Angeles Times

TRUCKS DUMP their loads into pumps that send concrete through booms into the foundation. The trucks' positions were plotted to the foot to ensure room.

With each pump averaging 100 cubic yards an hour, the job would take approximately two shifts and no more than a weekend.

Marchesano found that CalPortland Co. had eight mixing plants no more than a half-hour drive from downtown. He locked up the concrete, and CalPortland began shipping supplies early: cement from Mojave and Colton, aggregate from Irwindale.

The most critical aspect of the pour, however, would take place some 16 hours after the last truck left the site.

Often described as a fruitcake, concrete is a mixture of cement, aggregate and, in this case, fly ash that heats up when water is added, forming crystals that lend the material its strength. The heat typically dissipates in most pours, but the size and the depth of this slab meant the temperature would increase over the course of nearly two weeks. If not controlled, it would eventually crack the crystal structure, turning the slab into gravel.

With the help of a national expert in the field of concrete thermodynamics, Turner installed a radiator system in the foundation: a succession of looping hoses, 90,000 feet of polypropylene, that would draw off the heat by circulating 40,000 gallons of water chilled to 45 degrees. The hoses, eventually filled with grout, remain in the slab.

Because of concrete's sensitivity to heat, the construction company monitored long-range weather forecasts. A heat wave — mid-80s or higher — would increase the temperature of the delivered concrete beyond the capability of the chilling system.

As the countdown clock approached zero, mechanics and supply trucks were poised to repair the concrete pumps if any failed. An infirmary was staffed, and tarps and tents were stockpiled in case of rain. The outside temperature was within margins.

At that point, only a lightning storm would delay the pour. The booms, angling into the pit, could serve as conductors.

By late afternoon on Feb. 15, under clear skies and with temperatures dropping from a high of 78 degrees, the convoy of mixing trucks had followed their instructions: Exit the 110 Freeway at 6th Street and either continue to Flower and turn right on 7th, or turn on Figueroa, before being directed to the site.

At 4:47, after the VIPs had finished their speeches and with the USC marching band playing, concrete began flowing into the forest of reinforcing steel.

Throughout the night, pumps fed the mix through booms, angled like scorpion tails from the road down to the hole.

Crews stood on top of the forest and with long, snake-like vibrators dispersed the mixture as it flowed from the booms through the tremies, flexible nozzles shaped like elephant trunks that deposited the slurry into the bottom of the pit.

When the last of the concrete reached the pit at 11:30 Sunday morning, the slab measured 17 feet, 7 inches deep. The remaining five inches would be added at a later date to provide a more polished look.

The particles of cement, fly ash and water began to crystallize. Long chains of calcium silicate hydrate filled the spaces between the sand and aggregate, and for the next two weeks, sensors would record the increasing temperatures in the slab.

They varied by as much as 35 degrees throughout the foundation, an acceptable difference, with some reaching 158 degrees, two degrees shy of the limit.

John Gajda, the expert in thermodynamics, was satisfied. "It was a logistical nightmare," he said afterward. "I would call it a dance, but it was really a ballet."

An adjudicator from Guinness World Records confirmed the accomplishment.

Turner Construction Co. had beat the Venetian for the largest continuous pour by 200 cubic yards, enough to lay a suburban sidewalk for almost a mile.

Marchesano allowed himself a moment of reflection. "How could you not want to be part of this?" he asked, thinking back to the photo on his desk. "It beats doing a tilt-up."

Then he began looking ahead.

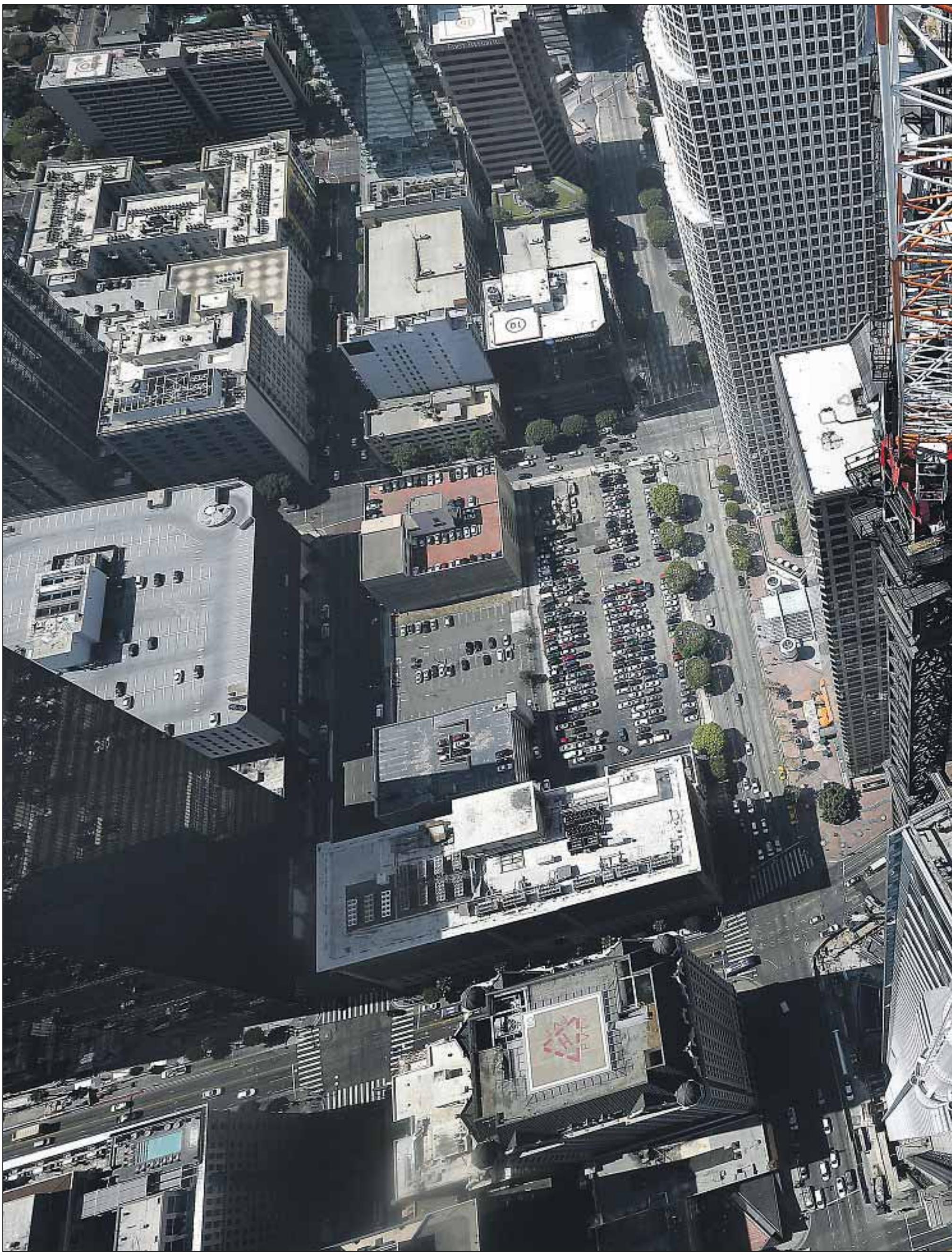
He needed to start building a platform on top of the concrete for crews to assemble a climbing system that would start pouring the concrete tower.

And now he could get rid of that mound of dirt.

WILSHIRE GRAND THE RISE OF A NEW SKYLINE

LIFTED ABOVE

For all its 21st century grand effects and engineering feats, the Wilshire



IRON WORKERS Pete Veliz, Vince Parker, and Ray Shoats can almost touch the sky from inside the spire attached to the Wilshire Grand. Rising 1,100 feet — not counting

WORKERS POSITION pipes into place while standing above an 18-foot hole that will be filled with concrete to form the foundation for the project.

CEMENT FINISHER Jaime Velasquez, center, smoothes out a concrete deck after it is poured on the 9th floor of the concrete core of the Wilshire Grand.

THE HORIZON

Grand is a throwback to a time when Los Angeles dared to dream tall

Photographs by MEL MELCON Los Angeles Times

a 2-foot lightning rod attached to the top — the towering high-rise at Figueroa Street and Wilshire Boulevard has earned a place in history.

IRON WORKERS perform a delicate ballet amid towering walls of rebar. Structural crews are known for an intensity that comes from the dangers of the work.

A WELDER attaches clips onto a steel column at Schuff Steel in Phoenix, where the Wilshire Grand project's steel was fabricated.

WILSHIRE GRAND THE RISE OF A NEW SKYLINE

Photographs by MEL MELCON Los Angeles Times

ARCHITECT DAVID MARTIN'S concept for the Wilshire Grand's skylight was inspired by the Yosemite Valley and the Galleria Vittorio Emanuele II in Milan.

A VISION'S QUEST

That signature skylight, inspired by Yosemite, was almost scrapped. Here's how it overcame financial realities and engineering concerns.

Construction manager Scott Borland had no doubt that the skylight rising above the entrance to the Wilshire Grand would be spectacular.

But then, everything looks good on paper.

Draped between the 1,100-foot skyscraper and its seven-story companion, the skylight runs nearly the length of a football field, dropping 65 feet — like a ski slope — as it flows between the two buildings and marks the entrance to the hotel.

Architect David Martin called it the signature element of the project, a river of glass inspired by the Yosemite Valley. Martin also evoked the Galleria Vittorio Emanuele II in Milan, the glass-ceilinged arcade located between the city's cathedral and opera house, known as il salotto di Milano, Milan's living room.

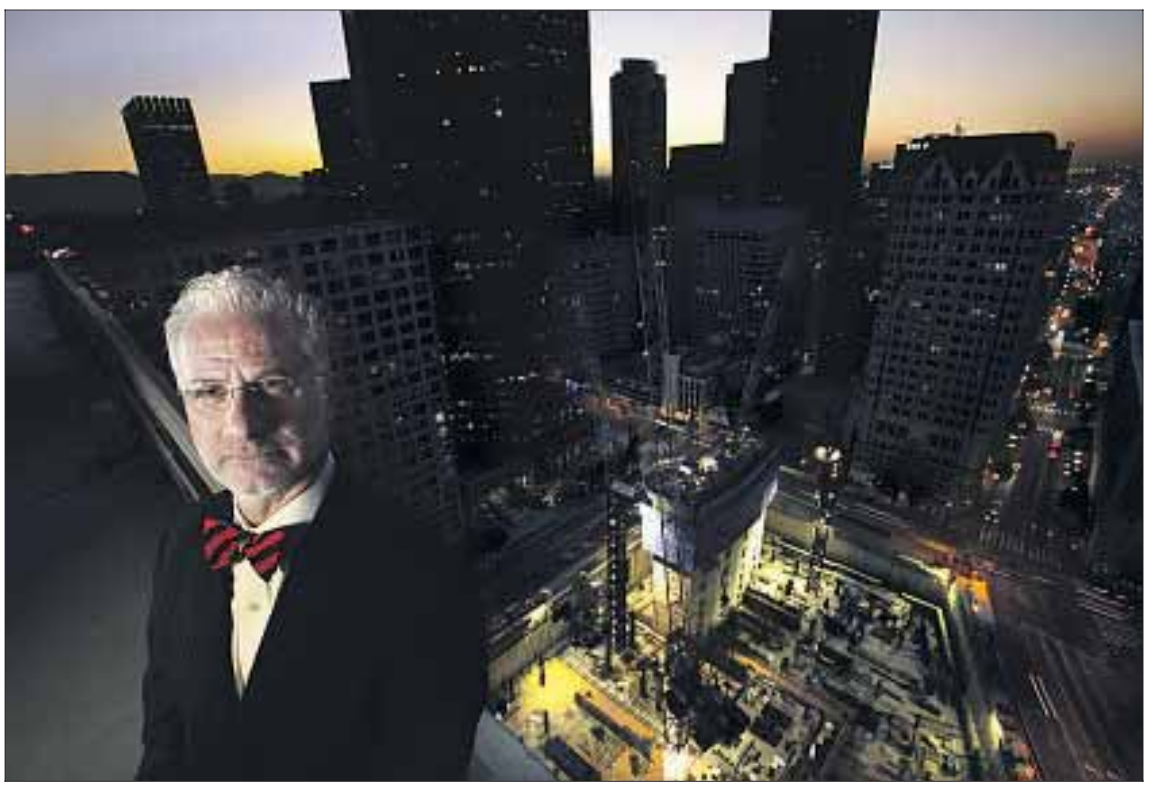
But neither a living room nor Yosemite came to mind as Borland studied the plan.

"You've got to be kidding me," he thought.

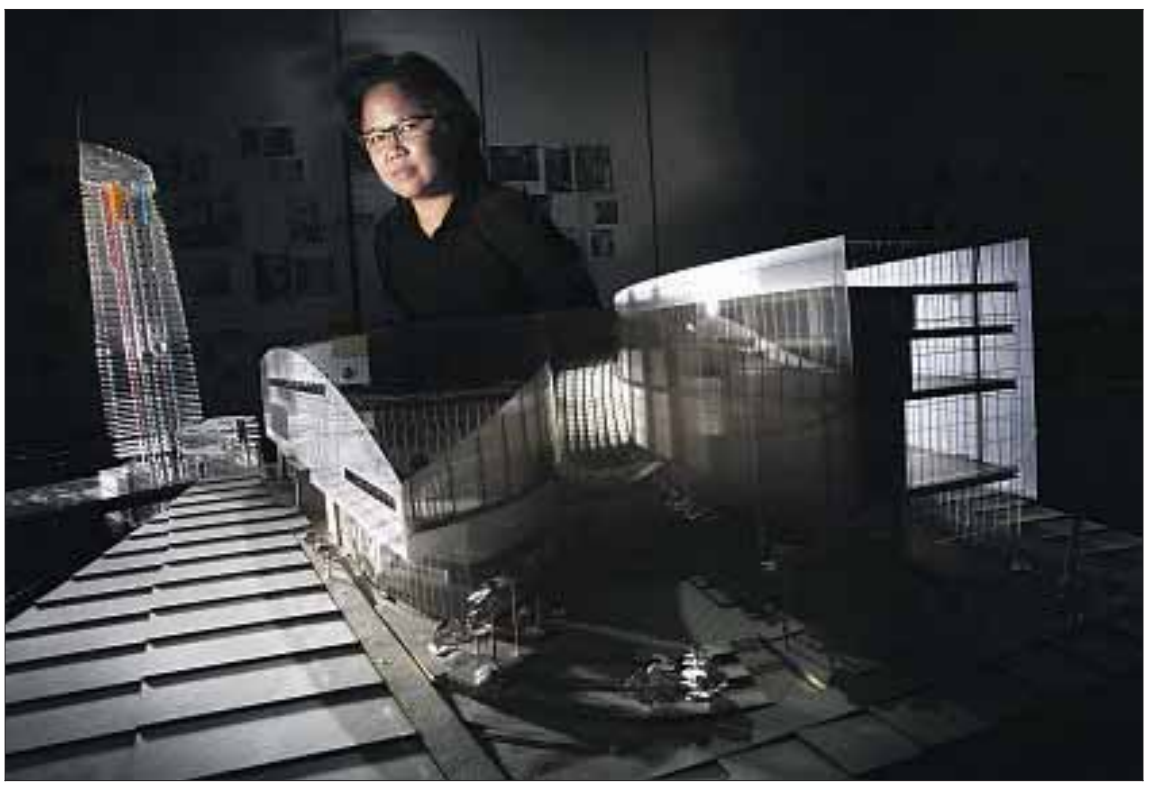
Twenty years' experience on high-rises in Manhattan had made Borland a practical man. As construction executive in charge of day-to-day operations for the Wilshire Grand, he found the skylight an extravagance that would certainly cost more than the $3-million estimate.

He wondered if it were even possible to build such a structure. Then how would it react during an earthquake? Could it support the weight of a cleaning crew?

Martin and his design team might not like what Borland had to say, but he couldn't keep his opinion to himself.



KENNETH ASPIS was responsible for keeping the Wilshire Grand project within budget. "We're not always viewed as the friendliest people in the room," he says.



TAMMY JOW, senior designer with A.C. Martin, defended the skylight concept as "lyrical and poetic" in design. "In the eyes of estimators and contractors, anything square is better," she says.

Raising a tall building is an exercise in compromise and negotiation, a choreographed clash of disciplines intended to make the project better or safer — and economical.

Architects advance designs. Engineers, accountants and consultants step up with their critiques.

Forget vanity or hubris: The principal function of a tall building is to make money, and beauty, if it doesn't bring in tenants and guests, can become a heated point of discussion.

Martin likened the debate to a game of poker, with each design element a hand to be played.

"You have to know when to hold them and when to fold," he said.

The stakes for the Wilshire Grand were especially high. The project presented Martin with a once-in-a-lifetime opportunity to build a landmark in downtown Los Angeles, much as his grandfather did with City Hall and his father did with a number of high-rises, including the Department of Water and Power Building.

He had never expected to dream this big. By the fall of 2014, he was 71 and had spent more than 50 years at the family firm watching as market conditions limited his aspirations.

All that changed in 2009.

A friendship that his cousin and business partner, Chris Martin, had struck with South Korean businessman Yang Ho Cho, the chairman of Korean Airlines, led to a coveted commission. A.C. Martin Partners would design a hotel and office complex at Figueroa Street and Wilshire Boulevard.

David Martin began by dusting off plans shelved in 2005. He had designed a 55-story tower for the Grand Avenue Project near City Hall, but the project was awarded to the city's most celebrated architect, Frank Gehry.

The decision was a blow for Martin. He retreated a little before finding his way back, said senior designer Tammy Jow, who has worked with Martin for two decades. Creating a 73-story skyscraper, the tallest building in the West, gave him a new reason for coming into the office. "He was very accomplished before this, but this was the icing on the cake," Jow said.

A window ledge in Martin's modest downtown office grew cluttered with cardboard and plastic models. Pages in his sketchbook filled with ideas.

Rendered in black ink and a blue wash, the tower's beveled and faceted facades described a surprisingly slender building that, in spite of its height, seems light, even gauzy.

"Diaphanous," Martin said.

With echoes of the Case Study houses in Los Angeles, the arcade in Milan and all the piazzas in Europe that he visited as a student years ago, he hoped to create a more intimate space, an invitation for visitors to explore, linger and, as he explained, "develop a relationship with the property."

He poured himself into the project, and even though he knew he had the support of the owner, he prepared for the clashes.

Opening salvos were fired during weekly progress meetings. Seated around a long table each Tuesday, more than 20 of the project's engineers, architects and managers discussed every element of the design.

Concrete versus drywall. Wood versus vinyl. Paint versus wallpaper. Stone versus carpet.

The start of big projects is often quarrelsome, and the Wilshire Grand was no exception. One of the first arguments took place in the fall of 2012 and came from an unexpected quarter.

The Metropolitan Transportation Authority objected to the excavation plan for the foundation, arguing that the dig, nearly 100 feet

deep in some places, could release pressure in the adjacent soil where the Red Line ran under 7th Street. If the soil moved, the subway tunnel might shift and crack.

A.C. Martin had wanted to dig within five feet of the tunnel. The project's subterranean garage needed nearly 1,100 parking spaces, and every foot mattered.

But Metro thought five feet was too close.

As the dispute escalated, civility got lost to expediency.

At one point, engineer Marty Hudson, who chaired meetings on behalf of the builder, knelt in a parking lot beforehand to pray for composure, especially if everyone else lost theirs.

"This was the highest level of stress that I have had in my career," Hudson said.

The transit agency suggested seven feet, said Carey McLeod, lead project manager for the architect, then in a later meeting, eight feet. Finally Metro made it clear: Five feet or 50 feet, the agency wouldn't propose a plan.

"We're not in the business of doing the engineering for third parties," Metro engineer Matthew Crow later explained.

The comment frustrated McLeod. New York, London and other cities with subways have established standards for such digs. Why couldn't Metro just provide a number?

But Metro held firm. It wanted the builder — not taxpayers — to pay for a thorough analysis before any decision was made.

"So it will cost you a few million extra to evaluate and instrument the subway," Sam Mayman, one of Metro's executive officers, said, according to two people at the meeting. "Big deal."

Eventually, the builder paid nearly $1.5 million for analyses and monitoring.

When completed, the excavation came within seven feet of the subway tunnel, which shifted half an inch but did not crack.

Borland's suspicions that the Wilshire Grand would face cost overruns came true.

More reinforcing steel had to be ordered for the foundation. A restaurant was added on the 69th floor. The bathrooms in each hotel room needed to be reconfigured to accommodate separate showers and tubs.

Plans were scrapped, redrawn and recalculated.

Costs crept from $1 billion to $1.1 billion, and the debate sharpened over what was important to the design.

Balancing the interests of the designers and the project managers fell to Kenneth Aspis, president of the firm overseeing the development. His responsibilities included keeping the project within budget and, if necessary, finding less expensive ways to achieve the same results.

"We're not always viewed as the friendliest people in the room," Aspis said.

The discussions about costs forced Martin to defend his choices. He found it irritating.

"If you ask a structural engineer to design a building, it would be triangular," Martin said. "If you asked a leasing agent, it would be square. If you asked a wind expert, it would be round. This is why you ask the architect to design a building and not the consultants."

When asked about an undulating glass wall that surrounds a rooftop pool, deck and gardens, Martin argued that glass added visual momentum to the structure. It was shortened by 15 feet for a savings of $400,000.

When asked about a $3-million aluminum screen covering mechanical equipment visible from the hotel, Martin explained that guests don't want to look down upon compressors, cooling towers and exhaust vents. The screen remained.

And the windows that open in each hotel room?

Growing up in Los Angeles, Martin admired the Case Study houses with their floor-to-ceiling panes of glass that opened to the outdoors. He wondered: How can you do that in a larger context?

Casement windows were the answer, but the cost, $8 million, was too high. So for $3 million less, they would be put in the premium rooms only.

Maybe the savings could be applied to the skylight: Martin's grand vision had begun to unravel.

The design for the Wilshire Grand featured a plaza, a high-rise tower and a secondary building, known as the podium, housing a restaurant, a pool and ballrooms.

Connecting the elements became the challenge.

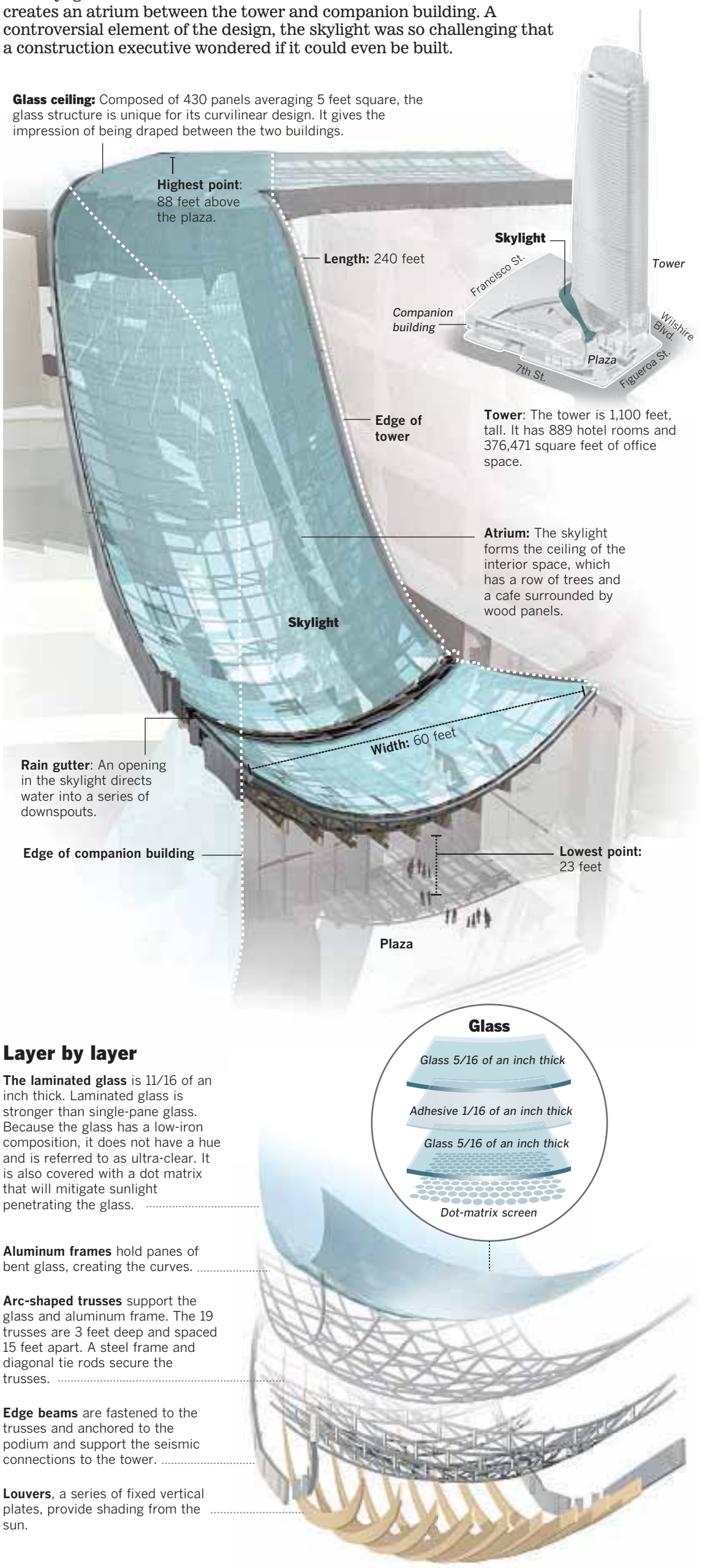
One plan included an ambitious Guggenheim Museum-like rotunda. Another tried extending the tower's facade over to the podium. Neither worked.

Finally, in the winter of 2012, Martin hit upon a skylight, a sweep of glass that unified the space and created an atrium where guests entered the hotel.

Jow said the solution was elegant and dramatic — a eureka moment that thrilled the design team. Then reality struck.

River of glass

The skylight at the Wilshire Grand marks the entrance to the hotel and creates an atrium between the tower and companion building. A controversial element of the design, the skylight was so challenging that a construction executive wondered if it could even be built.



Layer by layer

The laminated glass is 11/16 of an inch thick. Laminated glass is stronger than single-pane glass. Because the glass has a low-iron composition, it does not have a hue and is referred to as ultra-clear. It is also covered with a dot matrix that will mitigate sunlight penetrating the glass.

Aluminum frames hold panes of bent glass, creating the curves.

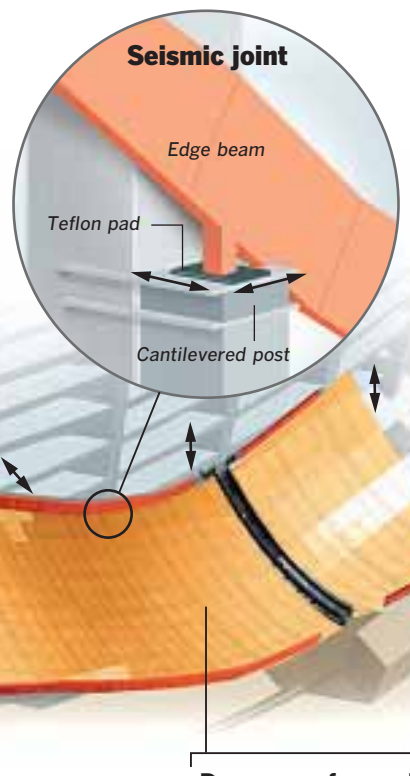
Arc-shaped trusses support the glass and aluminum frame. The 19 trusses are 3 feet deep and spaced 15 feet apart. A steel frame and diagonal tie rods secure the trusses.

Edge beams are fastened to the trusses and anchored to the podium and support the seismic connections to the tower.

Louvers, a series of fixed vertical plates, provide shading from the sun.

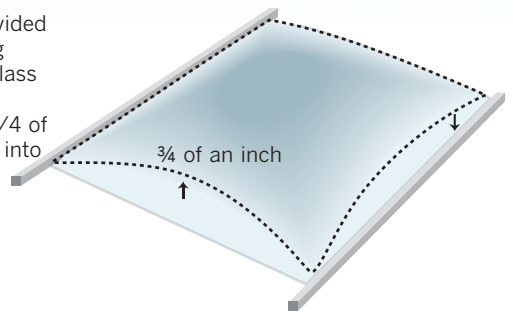
Engineered for safety

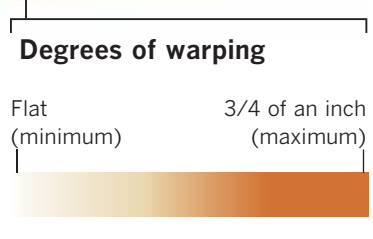
The skylight is be able to move up to 15 inches in four directions during an earthquake. Retainers are positioned above the skylight in the event that it lifts up during a windstorm.



Cold bending

Glass manufacturers provided specifications for bending glass without heat. The glass was warped — in this instance, no more than 3/4 of an inch — then snapped into an aluminum frame that holds the shape.





Sources: Tammy Jow, Joseph Varholick, Isaac Luna, A.C. Martin; John McDonald, Catena Consulting Engineers; Melissa Johnson, Benson Industries Inc
Graphics reporting by Thomas Curwen

Lorena Iñiguez Elebee Los Angeles Times

Borland and Aspis had to protect the budget and started to question the complexity of the design.

Martin's early vision, rendered by computer, included convex and concave curves that required individual panels of glass to be custom bent, an especially costly process.

Seismic tests also determined that the structure would have to move 15 inches — side to side between the tower and the podium — in the event of a major earthquake, and it would have to be restrained from lifting up in a windstorm. No one was certain if it could be engineered.

Then there was the question of how it would be cleaned.

One design suggested two catwalks 3 feet wide for cleaning crews, but the structures encroached on the view. Another recommended trapdoors, but they detracted from the appearance.

As other costs on the project rose, the skylight became a target.

"In the eyes of estimators and contractors, anything square is better," Jow said. "The fact that we had something lyrical and poetic in the design is a conflict in their minds."

That's not the way Borland saw it. "The difficulty is that the client has a vision for the project that isn't in keeping with the budget," he said. "And the design team always wants more."

The budget for the skylight was cut in half to $1.5 million, Jow said, and that was before cost estimates came in for the steel and its design: more than $5 million. And the custom glass panels would add more.

To ease tensions within the team, Jow deferred further discussion until she and the designers could answer the most persistent complaints.

She and designer Joseph Varholick traveled to Europe to learn about a process in glass design known as cold-bending. Instead of heating glass to shape it, fabricators contort the cold glass slightly, then snap it into frames that have been engineered to hold the shape.

Huddling at his computer, Varholick calculated that with 475 glass panels, the skylight would have the sweep and grandeur that Martin had called for. And each of the panels would be essentially flat, bending no more than three-quarters of an inch.

His work helped ensure that the glass would cost no more than $2 million.

Jow's team took its findings to the engineers and budget managers. The designers thought they were making headway, only to discover later that the skylight was still listed for elimination.

Martin tried to hold fast. The skylight was a defining stroke. Still, he grew so frustrated that he yanked the skylight from the plans.

As Jow explained, he was tired of being second-guessed by cost managers who "would prefer to drop in a plaster, stucco box at the front door."

"Any designer would be insulted," she said.

Martin even presented an alternative: an open-air trellis much like the Lath Palace at the Botanical Building in San Diego's Balboa Park. But priced out, that idea saved no money.

So he took the issue to cousin Chris, who had the authority to set budget guidelines for the project. He knew it was a gamble, but the debate needed to be settled. Chris could either vote against the feature or make a concession.

Eventually Chris agreed that the skylight would remain but with one stipulation. With the glass already priced at $2 million, he insisted that the steel and its design cost no more than $5 million.

The design team then reconsidered the structural beams that supported the skylight. They curved as they followed the contour of the podium and tower.

After studying the elevations and cutaways, the designers realized that the beams would not need special fabrication to flow between the buildings. The same effect could be achieved for less money with straight pieces, segmented to follow the curves of the structures.

The solution was a breakthrough. By Jow's estimate, it saved about $500,000 and ensured that the steel would come in under budget.

Shortly afterward, engineers were able to devise an attachment that allowed the skylight, fixed to the podium, to move on the tower side during an earthquake. And to support cleaning crews, they added ring hooks in the tower and made the glass thicker to withstand up to 300 pounds.

In early September 2014, the project's engineers, architects and managers gathered for one of their weekly meeting.

Martin and Jow were eager to discuss the skylight. They had decided that they had found the least expensive and best solution. They wanted it approved. And at last, it was — 21 months after Borland first saw the plan.

For $6.5 million, the Wilshire Grand would have its river of glass.

WILSHIRE GRAND THE RISE OF A NEW SKYLINE

MEL MELCON Los Angeles Times

FOR MORE THAN two years, Leonard Joseph has been consumed by the challenge of making the skyscraper stand up to Southern California's fierce quakes.

BUILT TO STAND FIRM

One of the tallest towers to be erected in an earthquake hot zone is a hard-fought compromise between safety and style

On engineer Leonard Joseph's computer screen, the Wilshire Grand was an apparition of white lines floating calmly in black space.

Then Joseph clicked his mouse, and the 73-story tower began to move, slowly at first, then more violently, as a simulated earthquake, magnitude 7.8, shook its foundation.

The skyscraper bowed, swayed and wobbled.

Joseph was incredulous.

"It's like those inflatable figures on the roadside," he remembered thinking.

If the tower were to dance like that, he realized, it would never stand. The more it bent, the more the gravity load would increase the bending, and down this billion-dollar hotel and office project would fall.

Joseph knew the computer had amplified the movements 50-fold to make the trouble spots obvious, a 150-foot bend being more conspicuous than a three-foot bend.

Even so, he found the images disturbing, a reminder of the risk of raising a skyscraper in Southern California.

The structure at the corner of Wilshire Boulevard and Figueroa Street is one of the tallest ever built in a seismic hot zone. Its design has undergone the most sophisticated earthquake modeling performed on a building in Southern California.

But even that has its limits.

"Earthquake design is a fuzzy proposition," said Joseph. "You can't ask an engineer to guarantee that a building will never collapse in an earthquake. That is not fair....

"You can ask that it will behave as well as possible, meeting at least the code requirements. Even that's a heavy responsibility."

By the fall of 2014, the challenge of making the Wilshire Grand stand up to fierce ground movements had consumed Joseph for two years.

Early tests showed that the tower needed special bracing at three points to prevent catastrophic failure, but there was another problem.

On the top floor, an earthquake could deliver a whiplash up to 4gs of acceleration, more than space shuttle astronauts experienced during launch.

The results doomed the architect's original vision for the top of this soaring edifice: a filigree of steel encased in glass and topped by a spire. Rising 300 feet above the tower, the features — too tall, too light — would never survive those top-floor forces.

On that point, there was no room for debate.

"There are some things you can't negotiate. You can't negotiate with God or Isaac Newton," Joseph said.

If every building is an act of defiance against the laws of physics, then a skyscraper is a brazen assault. Vertical forces push down, and lateral forces push sideways, each capable of damaging if not toppling the structure.

Before leading a team of engineers who designed structural elements of the Wilshire Grand, Joseph hadhelped shape some of the world's most distinguished skyscrapers: the Petronas Towers in Malaysia, Taipei 101 in Taiwan and Shanghai Tower in China.

Los Angeles' tower, however, proved to be in a class by itself.

Architect David Martin wanted large windows in every room, which required a relatively new style of construction using a concrete core.

To make space for an adjoining plaza, he pushed the tower to a corner of the site, limiting the size of the foundation.

To increase energy efficiency, he gave the skyscraper two narrow sides and two broad ones, like a domino standing on end.

The result was a slender, airy design whose purpose was to be a beautiful hotel, not a fortress against earthquakes.

The engineers were left with the job of having to fortify it.

The Wilshire Grand's design had to have the right combination of structural elements to keep the building erect when pushed down by gravity or pushed sideways by windstorms and earthquakes, the principal forces that lead to failure.

In 1884, William Le Baron Jenney designed the 10-story Home Insurance Building in Chicago using steel columns and beams instead of bricks and mortar to support the building. For most of the next century, steel girders angled like jungle gyms above American streets.

But steel-frame buildings lose their efficiency at about 60 stories.

In the 1970s, a new technique allowed buildings to shoot skyward. In place of the jungle gym, buildings were held aloft by perimeter columns. With its twin towers standing 110 stories, New York's World Trade Center was the nation's grandest example.

The perimeter columns had one drawback, however. They obstructed views.

In the 1990s, advances in concrete technology had led to the conception of a high-rise as two interdependent structures: A concrete core, rising the height of the tower, serves as the central support for a skyscraper built around it. Exterior columns are still necessary, but they are much smaller.

High-rises with narrow concrete cores can be additionally supported with structural elements known as outriggers: braces that form giant triangles with horizontal and diagonal members extending from the core to the perimeter columns.

Together, the outriggers and columns act like ski poles for the concrete core, helping to resist vertical and lateral forces.

The style met Martin's requirements for the Wilshire Grand. Thirty outriggers, positioned between the 28th and 31st floors, the 53rd and 59th floors and the 70th and 73rd floors, extended from the core.

But that didn't mean the tower could survive earthquakes.

To engineer Marty Hudson, earthquakes are like fingerprints. No two are alike, which makes it impossible to design a building as unusual as the Wilshire Grand from the equations found in building codes.

Hudson was asked to create simulated earthquakes to test the tower design.

Working with data prepared by the California Geological Survey and the Southern California Earthquake Center, he began by cataloging nearly 100 local faults, poring over analyses of their geometry, type, slip rate and maximum possible magnitude.

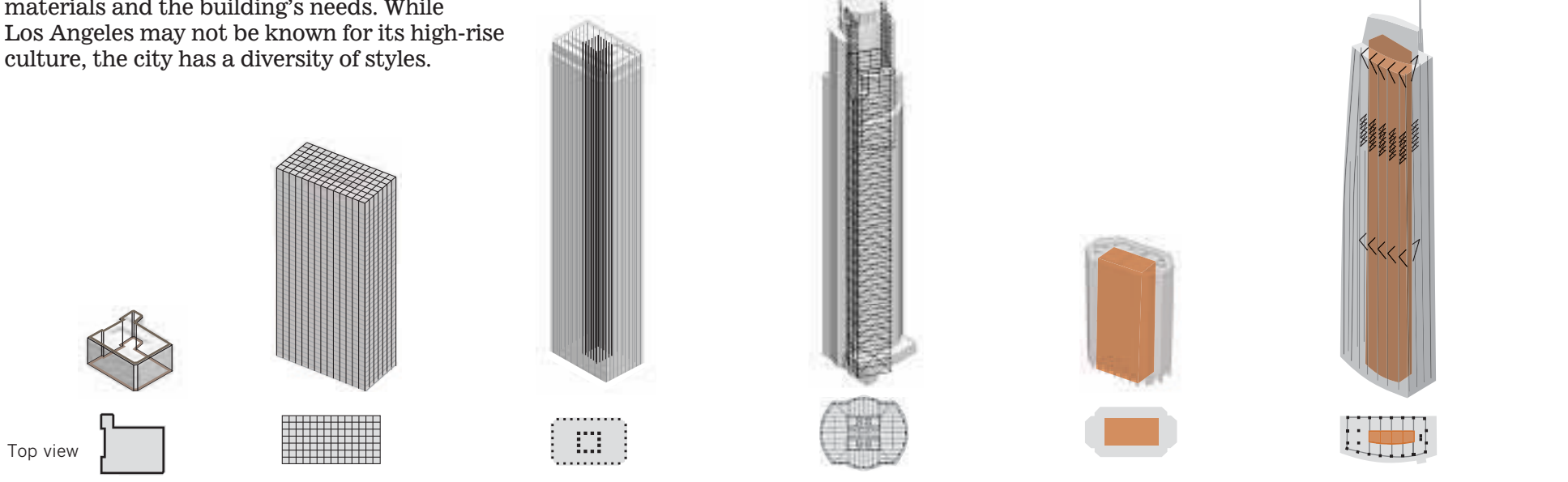
Hudson studied how waves of energy, generated by earthquakes ranging from magnitude 4 to the low 8s, moved through the earth across Southern California. From that, he extrapolated how the earth movements would translate into shaking at the corner of Wilshire Boulevard and Figueroa Street.

The goal was to evaluate the greatest jolt that the building could experience.

Hudson then needed to understand how that energy would play out, second by second, as the earth

The evolution of building design

There are many ways to hold up a tall building. Over the last 100 years, structural styles have come and gone, depending on the availability of materials and the building's needs. While Los Angeles may not be known for its high-rise culture, the city has a diversity of styles.



Masonry
Bradbury Building
304 S. Broadway
Completed: 1893

Moment-frame
Union Bank Plaza
445 S. Figueroa St.
Completed: 1968

Braced core
Aon Center
707 Wilshire Blvd.
Completed: 1973

Tube system
U.S. Bank Tower
633 W. 5th St.
Completed: 1989

Concrete core
Chase Plaza
801 S. Grand Ave.
Completed: 1986

Concrete core with outriggers
Wilshire Grand
900 Wilshire Blvd.

Sources: Carey McLeod, Noel Moreno, A.C. Martin; G.G. Schierle, USC School of Architecture; Dave Eichten, Pankow. Graphics reporting by THOMAS CURWEN

LORENA IÑIGUEZ ELEBEE Los Angeles Times

moved. So he turned to records of actual earthquakes around the world that came from faults similar to those in Southern California and were transmitted through comparable soil conditions.

Data in hand, the next step was to test the information against the Wilshire Grand's specifications.

Engineers turned to their computers, entering 112,500 lines of information that included such details as the size and location of the beams, columns and walls, along with their strengths, springiness and behaviors when overloaded.

Then they began running a program that pitted Hudson's earthquakes against the building.

The computations were so complicated that the computer needed nearly three days to run the simulations. The results provided visual representations of the building's movements and numeric spreadsheets that pinpointed failings.

The team scrutinized the data. Blue numbers meant that a brace or a wall had survived the shaking. Red numbers were trouble.

The tests helped the engineers refine the size and depth of the foundation, which would need to resist as much as 13.2 million pounds of force pulling up and 25 million pounds of force pushing down on each of the 20 perimeter columns as the tower swayed during an earthquake.

The numbers also pointed out a major problem. Strained by the force of Hudson's earthquakes, the outriggers jammed into the core, delivering more stress than the concrete could absorb. The inside walls between the elevators and stairwells were failing. Joseph saw wide cracks forming in the core.

Looking for solutions, engineers settled ona device known as a buckling-restrained brace. It consisted of a long steel bar encased in a steel box filled with grout. When a building moves, the steel box allows the bar to compress or stretch like taffy without buckling.

Joseph replaced each of the original wide-flange diagonal braces with one or more buckling-restrained braces.

He ran new tests, and the core survived. The Wilshire Grand would have 170 of these braces.

Joseph wasn't finished. He kept returning to the animation.

The 7.8 earthquake — derived from the one that struck Tabas, Iran, in 1978 — turned the skyscraper into a snake with broad undulations coursing throughout the structure. He knew the building could sway up to 8 feet in an earthquake, but these cobra-like movements were different.

Much as harmonics, overlapping vibrations, arise from a plucked guitar string, multiple vibrations occur in a building that has been shaken by an earthquake. These vibrations are waves of movement that travel up and down the structure.

Because of the height of the Wilshire Grand, it can produce more than 200 of these harmonics, jiggling that is caused and compounded by the speed and duration of the seismic waves.

Movement at the base of the tower could amplify into a roller coaster ride at the top. With possible accelerations of 4gs, engineers worried that the crown and spire might buckle or even land in the street "like a Hollywood production," Joseph said.

Removing those architectural elements was out of the question.

Luminous by day, illuminated by night, the sail-like crown was the building's hood ornament, a distinctive mark in the city's skyline. As an aesthetic decision — to show off its musculature — the sail was surrounded by glass.

Architect Martin wanted it to look delicate and lacy with long, A-frame diagonals. He had hoped that its light weight would enable it to withstand strong lateral forces. A magazine editor looked at drawings for the concept and said it looked like the Eiffel Tower, and the analogy stuck.

But Joseph knew that this Eiffel Tower would be unsafe. He had hoped that the reinforced outriggers would solve the problem by controlling the movement of the tower.

They didn't.

Engineers considered anchoring the sail to the building with long cables that would allow a gentle rocking. But further tests showed the sail would rock so violently that it would damage the concrete core.

A redesign of the sail into a shorter feature offered no advantage, structurally or financially.

Skeptics talked of eliminating the sail entirely, especially as its cost started to rise.

Martin insisted that it remain. But he had to compromise. The sail had to be sturdier, less light and airy.

Engineers refigured his Eiffel Tower into a 500-ton complex of wide-flange braces, ranging from 22 to 44 feet in length, crisscrossing like a cat's cradle. "We decided to go with brute force," Joseph said.

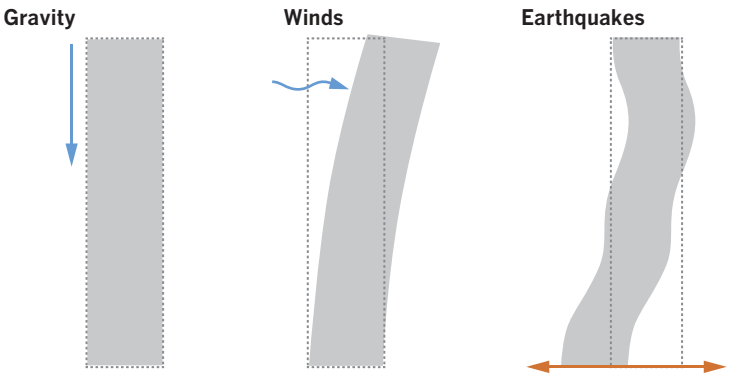
For Martin, the solution meant that the Wilshire Grand would retain its soaring prominence. Not flat-topped like the city's other high-rises, it could join City Hall as Los Angeles' other crowned edifice, adapted to the precarious reality of Southern California.

Man vs. nature

The Wilshire Grand is one of the tallest structures raised in a severe seismic zone. Its unique requirements forced engineers to find the right combination of structural elements that would keep the building standing during a catastrophic earthquake.

Physics 101

For every force in nature, there is an equal and opposite reaction. In the design of skyscrapers, gravity, winds and earthquakes are the greatest forces that the building reacts to.



The heavier the building, the greater the pressure on its foundation.

The lateral force results in gradually increasing deflection.

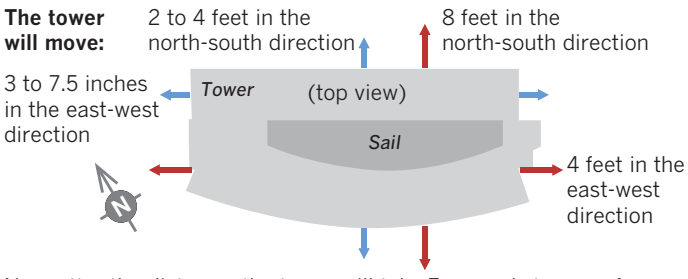
Shaking often creates an undulating motion.

From the 73rd floor

Guests on the top floor of the Wilshire Grand will need to hold on tight in the event of a major earthquake. Computer simulations and wind-tunnel tests allowed engineers to calculate movement during "maximum considered events."

Wind: A 3-second gust at 160 mph

Earthquake: In the range of magnitude 8



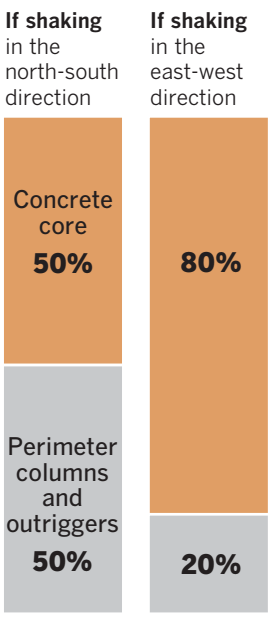
No matter the distance, the tower will take 7 seconds to sway from north to south and 3.5 seconds to sway from east to west.

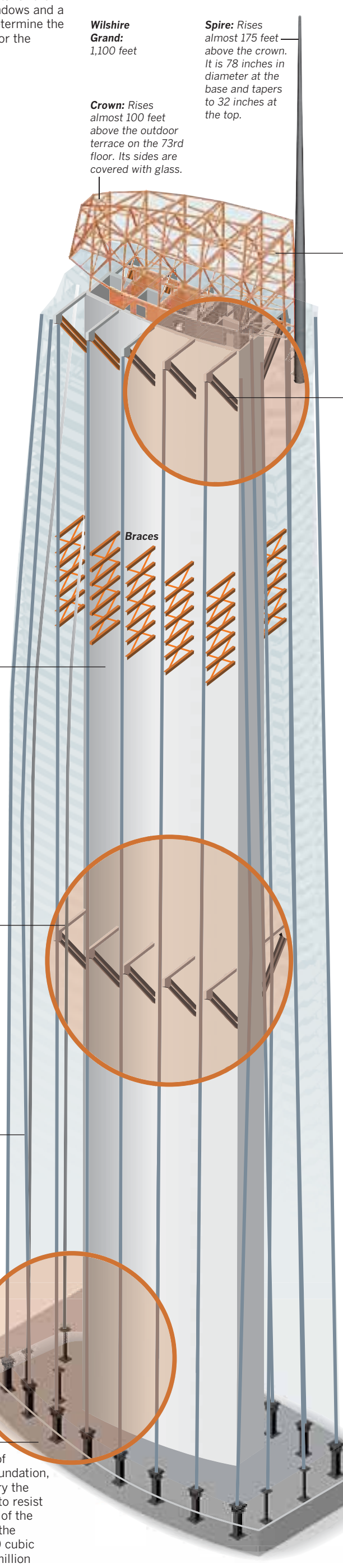
Underlying support

The architect's requirements for the Wilshire Grand — large windows and a narrow profile — helped determine the basic structural elements for the skyscraper.

Combined strength

All structural elements of the Wilshire Grand play a role in supporting the skyscraper.





Concrete core

Conceived of as a building within a building, the Wilshire Grand has a concrete core that serves as the central support for the tower built around it. The strength of the core allows for smaller exterior columns and uninterrupted views from the rooms. The core is 841 feet, 6 inches tall, with walls 4 feet thick at the base, tapering to 2 feet near the top.

Outriggers

The concrete core is supported with a series of structural elements known as outriggers. These braces form giant triangles extending from the core to the exterior columns. There are 30 outriggers located on floors 28-31, 53-59 and 70-73.

Perimeter columns

Surrounding the concrete core and defining the faces of the building, 20 columns work with the outriggers, helping to resist lateral and vertical forces that come from gravity, winds and earthquakes. The columns are concrete-filled steel boxes.

Foundation

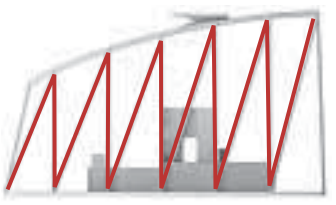
The most crucial element of the Wilshire Grand is its foundation, which was designed to carry the weight of the building and to resist forces from the movement of the tower. Eighteen feet thick, the foundation contains 21,200 cubic yards of concrete and 7.1 million pounds of reinforcing steel.

Refining the design

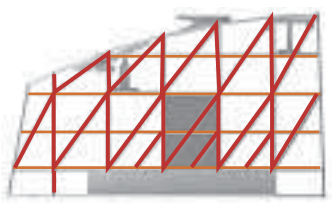
The Wilshire Grand underwent an extensive series of tests that led to significant changes in two aspects of its structural design.

Crown

During a severe earthquake, the top of the building would experience up to 4gs of lateral shaking. This acceleration forced changes to the original design of the crown: a decorative filigree of steel surrounded by glass.



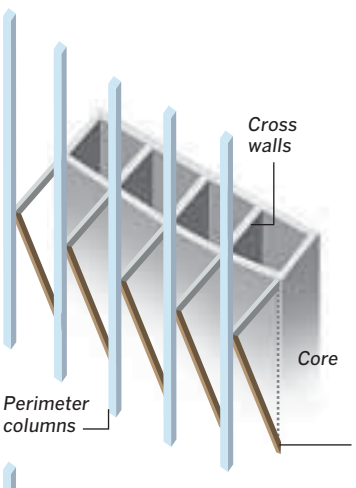
Original design: Long, A-frame diagonal braces created an Eiffel Tower-like look for the top of the building. The length of the braces put them at risk of buckling during an earthquake.



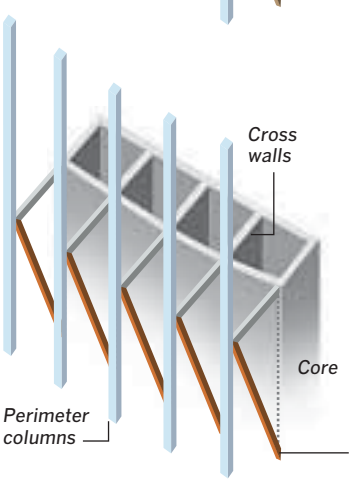
Improvement: Shortening the braces and adding more cross members made the crown stronger and sturdier.

Buckling-restrained braces (BRBs)

The undulating motion that occurs in the skyscraper during an earthquake exerts unique forces on the outriggers. Early tests showed that these forces would damage the core.



Original design: The outriggers consisted of wide-flange braces. During early tests, the braces that ran diagonally from the exterior column to the core exerted too much forces on the core. The five cross walls that divide the core for elevators and stairwells showed signs of failing.

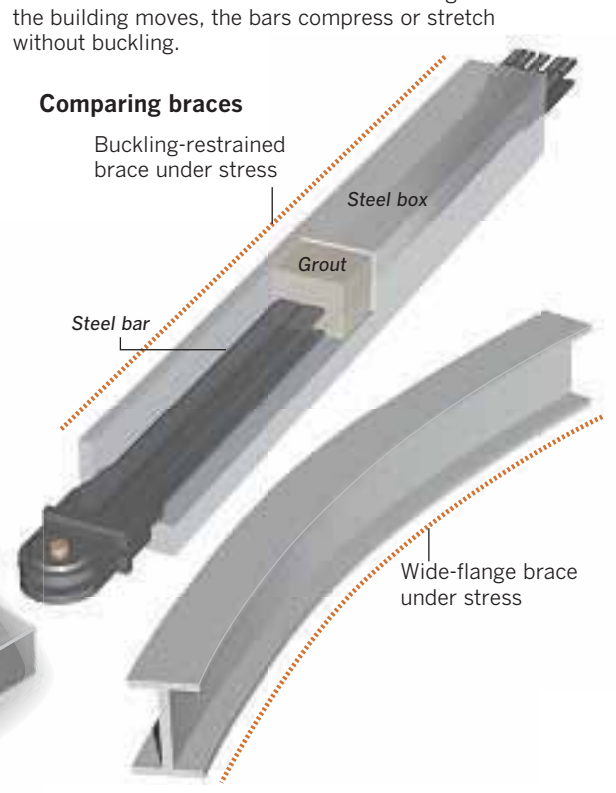


Improvement: Engineers replaced the wide-flange braces that ran diagonally from the exterior columns to the core with special braces, known as buckling-restrained braces.

A closer look at the BRBs

There will be 170 of these braces, with some outriggers receiving more than one. Each consists of a long steel bar encased in a steel box that is filled with grout. As the building moves, the bars compress or stretch without buckling.

Comparing braces



Sources: Leonard Joseph, Thornton Tomasetti; Tammy Jow, Joseph Varholick and Noel Moreno, A.C. Martin; Steve Carroll, Schuff Steel; Ian Aiken, SIE Inc.; Nippon Steel Engineering USA. Graphics reporting by Thomas Curwen

Lorena Iñiguez Elebee Los Angeles Times

WILSHIRE GRAND THE RISE OF A NEW SKYLINE

IRON WORKER Javier Jimenez guides a rebar wall into position as it hangs from a crane above. Rebar, which provides strength to concrete that would otherwise crack

NEW FRONTIER OF

Skill, daring and ego were as essential as steel and concrete as hundreds of workers pushed the ambitious project skyward

GLASS FOREMAN Gary Wahlenmaier, right, looks on as glaziers Carlos Riviera, left, and Joe Guevara sign their names on a 35-foot-long, 2,100-pound steel beam bound for the 72nd floor.

The elevator doors snapped shut behind Otto Solis and his fellow ironworkers. With a quick shudder, gears kicked in for a rattling 90-second ascent through the concrete structure rising at the corner of Wilshire Boulevard and Figueroa Street in downtown Los Angeles.

The men huddled in the confined space. Wearing hard hats, bandannas, kneepads and gloves, they looked like gladiators ready to fight.

It was the start of their 6:30 shift, a dark morning in December 2014 under drizzling skies at the construction site for the Wilshire Grand hotel and office project.

Foreman Solis and his crew of 10 belong to a class of ironworkers known as rod busters. Their job that day was on the 24th floor, where they would place steel that in three days would be encased in concrete, taking the structure up another story.

Consisting of small-diameter rods known as rebar, the steel provides strength to concrete, which would otherwise crack and crumble over time. Rebar is a crucial component of this skyscraper that at 1,100 feet is the tallest building west of Chicago.

The central element is the concrete structure known as the core. It houses the elevators and stairs and is surrounded by a skeleton of structural steel that supports the rest of the building.

The elevator jerked to a stop at the 19th level. The rod busters stepped onto a small platform and started climbing. Stairs, suspended from a deck nearly 30 feet overhead, swayed in rhythm to their steps.

Their final ascent was up a series of ladders. Twelve rungs to the first deck, then 20 to the second, 12 to the third and 24 to the top level — the gantry — open to the sky.

Even with the concrete core standing just a third of its eventual height of 73 stories, the view was spectacular. To the northwest: the observatory at Griffith Park and the Hollywood sign. To the west where Ballona Creek reaches the sea: a small blue line of ocean, obscured by squalls.

On Figueroa Street below, pedestrians with umbrellas moved like dots on the sidewalks.

Rain fell harder as Solis put on his tool belt: 15 pounds of equipment, including wrenches, tape measure, torpedo level, pry bar, pliers and a spool of annealed wire. He stepped into his safety harness, straps wrapping over his shoulders, around his hips and groin.

He made sure the lanyards extending from the harness were not tangled. When snapped onto the steel, the lines would catch him if he fell.

Twelve years ago, Solis was working maintenance for a McDonald's in Hollywood for $7.75 an hour. He had come to this country from Guatemala and never dreamed that in his first year as a rod buster he would make $36 an hour.

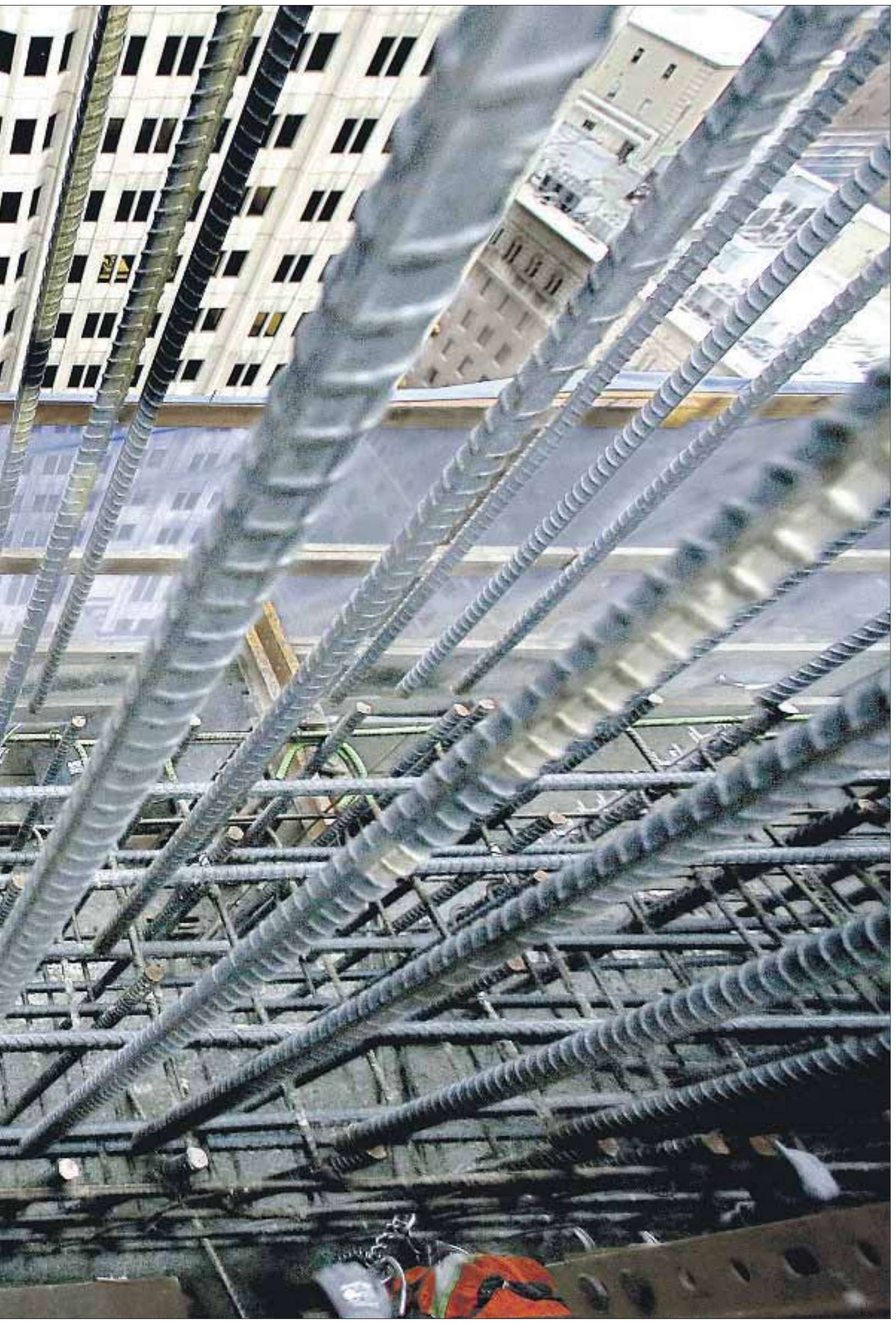
He has a home in La Puente, where he lives with his wife and three children.

"This is dangerous work," he said, "but it can change your life."

The rebar in the Wilshire Grand began its journey in a Rancho Cucamonga scrap yard.

Crushed steel was dissolved into liquid using a 3,000- degree furnace and amended with carbon, manganese, silicon and sulfur. The molten brew then was cast and cooled into 20-foot-long billets, 6 inches square, which were run through a series of rollers that shaped them into 225-foot lengths of rebar.

Cut and bent, the rebar was stacked in a crosshatched pattern and wired together by hand to create three-dimensional checkerboard structures through which concrete could flow. The structures, averaging 3 feet deep, 8 feet wide and 19 feet tall, are known as cages.



Photographs by MEL MELCON Los Angeles Times

and crumble over time, is a crucial component of this skyscraper that at 1,100 feet is the tallest building west of the Mississippi.

SKY COWBOYS

The height of daring design

With a steel spire as its calling card, the skyscraper offers a preview of what a more liberated skyline might look like

Lying in unremarkable repose, the last piece of steel to be raised atop the Wilshire Grand skyscraper rested among the dirt and debris of the job site, a baton awaiting the performance.

At 7:22 a.m. on Sept 3, the tower crane began to lift the 58-foot section of the building's spire on an eight-minute journey to the top, where, once bolted into place, it would give the Wilshire Grand the distinction of being the tallest building in the western United States.

Rising 1,100 feet — not counting a 2-foot lightning rod attached to the top — the towering high-rise at Figueroa Street and Wilshire Boulevard has earned its place in history as one of the loftiest structures structures to be built in an active earthquake zone.

But for Angelenos, the Wilshire Grand is most remarkable for changing the skyline of Los Angeles.

After years of negotiations in its early planning stages, its architects won concessions from city officials to shake off the old requirements of high-rise design — boxy and flat-roofed — and create a more stylish, vertical ornament for the building's roof.

For more than 40 years, the skyscrapers of Los Angeles have followed a building code that required landing sites for helicopters on top of all high-rises to be used in the event of emergencies. Architects for the Wilshire Grand, however, proposed an alternative that took a more modern approach to safety, which the city accepted and soon adopted for future construction.

Today the Wilshire Grand offers a preview of what a more liberated skyline in the city might look like. Urban designers and architects have applauded the change, believing that one day the airspace above the ubiquitous sprawl will incorporate the more daring and aesthetic shapes that have emerged in cities around the world.

"The flat-topped building has created one appearance to the high-rises of downtown," said Los Angeles-based architect Michael Maltzan, "but this evolution allows architects to do more and to have a broader palette."

The spire, designed in tandem with an adjoining structure of steel and glass known as the sail, serves as the Wilshire Grand's calling card. Its final 18 feet, a column of perforated stainless steel, glows with one of four LED lights: red, blue, green or gold.

Luminous by day, illuminated by night and branded with the logo of the building's owner — Korean Airlines — the spire and the sail are visible throughout the region and, for visitors downtown, an invitation from the street to gaze skyward to some imaginary vanishing point.

"Who knows what this will lead to and how skyscrapers will continue to evolve in the city?" said Maltzan.

For architect David Martin, who viewed the spire's final assembly from a rooftop two blocks away, the end of construction culminated a dream put in motion nearly 10 years ago when he first began drawing a concept for the $1-billion complex.

He never doubted he would succeed.

"The nature of being an architect," he said, "is to be a dreamer."

By 8:06 that morning, ironworkers finished bolting together the inside collar of the spire assembly, and the connection to the crane was released. The FAA navigational beacon on its tip glowed red.

"Towers first and foremost represent the ambitions, aspirations and identity of the developers and the corporations inside of them," Maltzan said, "but they also represent the city that they are in."

Assembled in San Bernardino, cages were trucked to the construction site, stitched together on the ground to form even larger cages and lifted by a crane to the top of the concrete core.

Once the cages were positioned, steel plates were attached to their sides and concrete poured into the gap, enveloping the rebar. After the concrete hardened, the plates were removed. Every four days, a new story was added to the core.

Suspended midflight, the first cage sailed over Solis and his men.

J.C. Cortez and Alvaro Reyes grabbed ropes hanging from either end of the structure and pulled it into position. Thirty feet wide, it weighed 22,000 pounds.

"*Cuidado con los dedos*," one man called out. Watch your fingers.

In December 2014, nearly 400 workers were on the job at the Wilshire Grand site, almost a third the number that would be there when the workforce peaked. They included ironworkers and the concrete gang, as well as carpenters, plumbers, electricians, glaziers and other specialists, each trade defined as much by ego and pride as by skill.

The various crews had learned how to negotiate a site no bigger than a city block.

Crowded with rebar, plywood, structural iron, scaffolding and machinery, the Wilshire Grand space offered little room for storage or staging.

Each day, project managers oversaw a carefully scripted schedule of truck deliveries and crane lifts for the immediate placement of materials.

"We knew that this job and this site would require patience and collaboration," said Michael Marchesano, a general superintendent for Turner Construction Co. "We needed to get into a rhythm with one another."

That rhythm was tested by a new phase of construction: the erection of the structural steel — beams, columns, braces and girders weighing up to 51,000 pounds —that would surround the concrete core.

On their first day working the Wilshire Grand, structural ironworkers Miah Thomas and Paul Graham performed a ballet 15 feet above a concrete deck.

With safety lanyards fastened beneath them, they walked a 7½-inch-wide beam as if it were a sidewalk, spud wrenches hanging from their belts like swords. With wedges and crowbars, they aligned drill holes and bolted the beam into place.

"Being a structural ironworker," said Chris Ahrens, a welder who watched the performance, "well, there is not much higher than that as far as being in the building trade."

Structural crews are known for their swagger and an intensity that some argue comes from the dangers of the work. Some working in other trades view them as prima donnas whose willingness to take risks makes it easy to question their intelligence.

Round bolt, round hole, one carpenter said as Thomas and Graham worked. How hard is that?

"Now being a carpenter, that takes brains," he continued. "Most project managers began as carpenters. Jesus Christ was a carpenter. That's all I'm saying."

Structural crews know they have a reputation as daredevils and hard partyers — and are trying to move beyond it.

"We cannot be viewed as the 'crazy guys up there,'" the union advised its membership in an article on its website. "We must replace myths and lies with the truth."

The Wilshire Grand crew turned down repeated interview requests from The Times.

"I learned to do as the old-timers taught me," said foreman Craig Castor. "Keep your mouth shut and work hard."

On the gantry, as the rain continued to fall, Johnny McCormack with the concrete company Conco gave the go-ahead to a pump operator working with the mixer trucks as they arrived off 7th Street.

From the pump, the mix flowed through a 5-inch-diameter pipe across the construction site and up 300 feet.

McCormack manipulated two toggles on a wireless remote control board hung around his waist, directing the movement of a long robotic arm that held a nozzle for dispensing the concrete.

Thirty years ago, delivering concrete to such a height would have been impossible, but chemical breakthroughs have changed that.

Special additives introduce tiny air bubbles, which act like ball bearings to help the mixture's flow. Other chemicals make the concrete movable and cohesive like gelatin, and some put a negative electrical charge on the grains of cement so they don't stick together.

Balancing on top of a rebar wall, a worker positioned the nozzle over a steel cage. The concrete dropped with the sound of a coffee percolator. Two men snaked electric vibrators through the rebar and into the mix, knocking out any air pockets.

If concrete is poured too fast, it will place too much pressure on the steel walls and they will bow out. If poured too slowly, the concrete will start to set and not bond to the next layer.

Five passes were needed to fill the western half of the core, a process that took almost 10 hours.

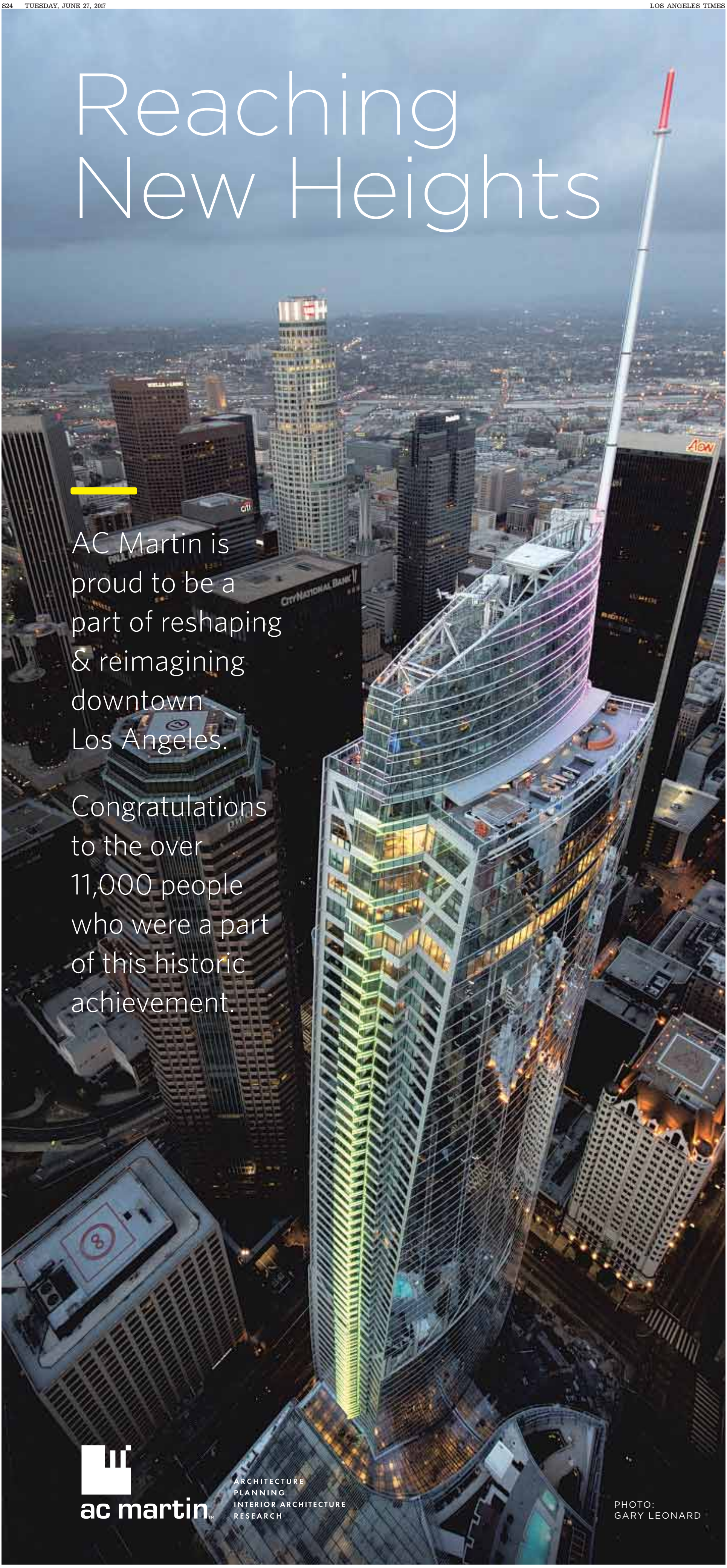
A little before noon, Solis decided that the weather had become dangerous. Wind gusts were clocking up to 20 knots, unsafe for flying steel, and satellite images of the storm showed showers increasing for the rest of the day.

Solis halted the work. He had hoped to fly seven cages, but they managed just three.

The rod busters headed to the ladders that would take them to the stairs and the elevator.

Solis stashed his tool belt in an equipment locker and grabbed his lunch cooler.

They would have to make up for lost time the next day.


Reaching
New Heights
AC Martin is
proud to be a
part of reshaping
& reimagining
downtown
Los Angeles.
Congratulations
to the over
11,000 people
who were a part
of this historic
achievement.
ac martin™
ARCHITECTURE
PLANNING
INTERIOR ARCHITECTURE
RESEARCH
PHOTO:
GARY LEONARD