

PLACEMENT OF THE FOURTH STAGE OF THE SELF-ANCHORED SUSPENSION SPAN (SAS) TOWER

If one single element bestows the status of “world-class” on the new East Span of the San Francisco-Oakland Bay Bridge, it is the Self-Anchored Suspension (SAS) Span. The 525-foot-reach of the single tower, one of several unique elements of the new span, will echo the towers of the West Span while helping give the SAS a unique profile.

The tower is made up of four independent steel legs, each of which is composed of five vertical sections. Cross bracings and shear link beams will connect the four legs. The shear link beams are designed to move independently of the tower to absorb seismic energy during an earthquake and to protect the tower from catastrophic damage. The damaged beams can be individually removed and replaced.

These new sections will bring the tower up to 480 feet (91 percent) of its final 525-foot-tall height. From tipping up these nearly 1 million-pound tower leg sections to building the erection tower and tower crane, this vertical construction has added a new dimension to the already astonishing and unprecedented engineering and construction that is synonymous with the seismic retrofit of the Bay Bridge. These are the final individual leg sections to be placed; the next lift is a single piece that connects to all four legs at the top of the tower.

STAGE 4

STAGE 3

STAGE 2

ERECTING THE TOWER SECTIONS

The leg sections are floated on a barge to the construction site and placed one at a time. The barge, equipped with rails, positions itself on the open east side of the erection tower. Strand jacks positioned atop the tower lift the top of the tower segment, while a winch-assisted tipping cart stabilizes the bottom as it moves down the rails. The tower section is pivoted from a horizontal to a vertical position. The strand jacks then lift the segment off the barge and into position inside the tower. To keep the barge steady while accommodating the shifting weight of the tower leg, thousands of gallons of ballast water are pumped from one side of the barge to the other through interior bulkheads.

Once the tower leg is vertical, crews detach the pin assembly connecting it to the barge; at that point it is only suspended by the strand jacks, which can hoist 1,455 tons or 2.9 million pounds. The first sections were placed onto the tower’s massive marine foundation. These initial segments slipped onto 150 steel dowels sticking out of the foundation, and fastened with 424 large anchor rods. When sections are stacked on top of each other, they are bolted together using splice plates.

After other sections are placed, workers then attach the tower legs’ cross bracings and shear link beams. The 20 sets of shear link beams, which connect the tower’s four independent legs, are designed to move independently of the tower to absorb seismic energy during an earthquake and to protect the tower from catastrophic damage. The damaged beams can be removed and replaced.

For the latest information, visit BayBridgeInfo.org/projects/sas-tower



THE SAN FRANCISCO-OAKLAND

BAY BRIDGE
SEISMIC SAFETY PROJECTS

CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

NEW SAS TOWERS OVER ORIGINAL EAST SPAN

STAGE 6: ELEVATION 525 FT (160.0M)

STAGE 5: ELEVATION 495 FT (151.0M)

STAGE 4: ELEVATION 480 FT (146.28M)

ORIGINAL EAST SPAN
ELEVATION 388.7 FT (118.48M)

STAGE 3: ELEVATION 374 FT (114.0M)
PLACED DECEMBER 2010

STAGE 2 ELEVATION 272 FT (83.0M)
PLACED OCTOBER 2010

STAGE 1 ELEVATION 165 FT (50.3M)
PLACED JULY 2010

THE SAS TOWER BY THE NUMBERS

105.6 FEET

Length of each leg in Lift 4

490.5 TONS (981,957 POUNDS)

Weight of each leg of Lift 4

1,455 TONS (2.9 MILLION POUNDS)

Lifting capacity of strand jack

560 FEET

Elevation of the operator cab on the tower crane

538 FEET

Elevation of the gantry on the erection tower

480 FEET

Height of tower after fourth lift is in place

525 FEET

Final height of tower when complete

85 FT X 73 FEET

Dimensions of tower's footing box (marine foundation)

21 FEET

Thickness of footing box

13

Number of concrete-filled steel piles supporting footing box

196 FEET

Depth of piles anchored into bedrock



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