



350 FOOT SECTION OF BRIDGE TO BE REPLACED OVER LABOR DAY WEEKEND

GREATEST CHALLENGE YET FOR BAY BRIDGE TEAM

As work nears completion on the Bay Bridge's West Approach in San Francisco, it is accelerating on the new East Span between Oakland and Yerba Buena Island (YBI), where an entirely new bridge is being constructed to the north of the existing truss-cantilever structure. When completed in 2013, the new span will consist of several main elements, including a 1.2-mile elevated Skyway, a signature Self-Anchored Suspension (SAS) span, transitional roadways connecting the SAS to the YBI Tunnel, and a new touchdown area in Oakland.

The building of the new span involves the elaborate staging of equipment and crews, major traffic shifts to temporary detour structures, and even bridge closures. But none of this is new to the Bay Bridge!

Last Labor Day weekend the eastbound lower deck of the Bay Bridge was closed for 77 hours to facilitate the removal of a 1,000-foot section of the West Approach's upper deck. In essence, this closure served as a "dry run" for the even more complex work to be performed this coming Labor Day weekend near YBI, when both decks of the Bay Bridge will be closed to traffic. This will be the first full bridge closure since the 1989 Loma Prieta earthquake closed the bridge for 30 days.

Like the work over Labor Day weekend last year, the upcoming closure will enable the removal of a large section of roadway on the bridge's upper deck. But unlike last year, the upcoming work will not end with the removal of a portion of roadway. It will also include the complete installation of a new, seismically upgraded replacement structure—roughly the size of a football field. In addition to the work, time will also challenge construction crews. The entire operation must be completed and the bridge reopened to traffic within three days.

THE YBI VIADUCT REPLACEMENT

The process of performing this work is nothing short of an engineering wonder. Although this procedure has been performed elsewhere, this is perhaps the first time that such ambitious



DEMOLISH AND REPLACE...

With the bridge closed to traffic, 350 feet of the upper deck will be cut out and replaced by a new section of seismically upgraded roadway, seen here under construction (right). The new section will be rolled into place as soon as the debris is cleared away.

work will be attempted within such a narrow timeframe.

The Bay Bridge must continue to serve as a regional transportation link—vital to the Bay Area economy. The objective over Labor Day weekend is to close the bridge on Friday at 8 p.m.—after the rush of holiday traffic has diminished—and to open it to traffic at 5 a.m. on Tuesday, in time for heavy weekday traffic to resume. Contractor CC Myers, Inc., which recently completed the repair of the MacArthur Maze freeway structure in record time, has built a career performing major demolition and construction work under tight deadlines.

When the bridge is closed, demolition will begin on 350 feet of the upper deck, known as the YBI Viaduct. Crews will cut through the concrete between the girders, and a giant crane will lift out roadway sections and load them onto dump trucks stationed on the

bridge's lower and upper decks.

Located next to the demolition site, a new seismically upgraded structure has been constructed on temporary support columns. As soon as demolition is completed and the debris cleared, this new structure will be raised by computer-controlled hydraulic jacks and rolled into place along temporary tracks laid across the bridge's lower deck. Once in place, the new roadway will be grouted and striped, electricity restored, the jacks and rails removed, and the bridge reopened.

Although motorists will not notice much difference when the bridge reopens, work during the three-day closure will have brought the bridge one important step closer to seismic safety. "Because the YBI Viaduct will be part of the permanent structures connecting the western end of the SAS to the Yerba Buena

(continued)



BUILDING THE NEW ROADWAY SECTION

Crews at work on the YBI Replacement Viaduct next to the existing Bay Bridge. Once the old section of the upper deck is cut away, the new 650 ton structure will be rolled into place.

Greatest Challenge Yet (continued)

Island tunnel, it is critical that it meets the same seismic safety requirements as the new bridge," said Bay Bridge Project Manager Ken Terpstra.

"This viaduct was built as part of the original 1936 bridge, when less was known about seismic safety construction and structures were designed to be rigid," said Terpstra. "Replacing this section of roadway under a full bridge closure makes sense," he added. "We will now have a new seismically safe roadway with a longer life span, which will be placed without jeopardizing the safety of our workers or motorists."

As a lifeline structure, the bridge must be able to accommodate emergency vehicles immediately after an earthquake and to reopen to traffic within 24 hours after a major temblor.

WHERE IT ALL COMES TOGETHER

Yerba Buena Island east of the tunnel is a very busy place as the new bridge progresses. A temporary bypass is now being built to enable the construction of the permanent Transition Structures

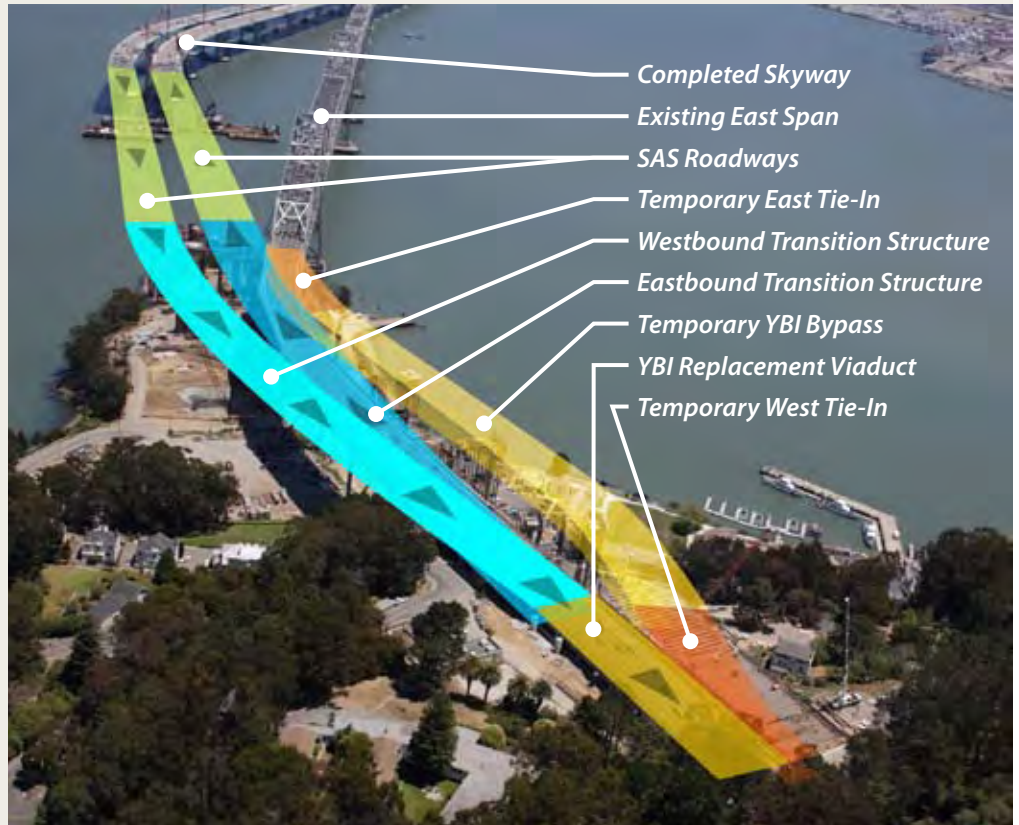
THE ROAD AHEAD: TRANSITION STRUCTURES AND YBI BYPASS

The work over Labor Day weekend represents the first in a series of phases to build a 900-foot temporary detour structure and permanent transition roadways near Yerba Buena Island. These new roadways, which are slated for completion around the same time as the new Self-Anchored Suspension (SAS) span, will connect the western end of the SAS span to the YBI Viaduct, and will segue the side-by-side road decks of the new span to the upper and lower decks of the existing Yerba Buena Island Tunnel and the West Span.

Constructing these transitional structures near Yerba Buena Island can only be accomplished with a major traffic shift south of the island. Referred to as the YBI Bypass, the temporary detour structure will route both east and westbound traffic around the southern side of the island in a steel double-deck structure similar to the existing roadway. The YBI Bypass will enable traffic to be maintained on the existing East Span during construction.

The enormous columns of the temporary detour viaduct, reaching 100 feet high, have already been constructed on Yerba Buena Island.

Traffic is slated to be shifted to the YBI Bypass in 2009, following the completion of an East Tie-In. This detour will represent the most complex traffic shift to date on the Bay Bridge.



NEW PUBLIC INFORMATION OFFICE OPENS ON TREASURE ISLAND

Because much of the upcoming work on the East Span will affect neighbors near Yerba Buena Island, a new YBI/TI Public Information Office has been established. The office will be staffed by Caltrans Public Information Officer Margena Wade, who has provided extensive outreach support to project neighbors near the West Approach since 2003.

Office hours are weekdays from 8:00 a.m. to 5:00 p.m. The phone number is (415) 597-5895. The office is located at 410 Avenue of the Palms, Building 1, San Francisco, CA 94130.



WORK CONTINUES ON MARINE FOUNDATIONS FOR THE SAS SUPERSTRUCTURE:



American Bridge/Fluor Enterprises, Joint Venture, has contracted with a host of manufacturers, fabricators, suppliers and subcontractors to supply and fabricate all major steel elements of the Self-Anchored Suspension (SAS) span. Thousands of shop drawings are in progress, with approximately 15,000 drawings necessary to facilitate shop fabrication.

Some bridge components are already being fabricated in the U.S. and abroad. A fleet of tugboats, barges, and other lifting and hauling equipment is being mobilized to eventually transport them.

Work in Oregon has started on the building of a 400-foot-long, two-ton capacity shear leg crane barge, which will be used to lift massive sections of the deck and tower.

In the Bay Area, the contractor has mobilized crews at several work sites, including Pier 7 in Oakland and on Yerba Buena Island, where work is underway to construct the pier cap to support the western end of the SAS. The contractor will soon begin the construction of temporary towers that will support the new road deck until the entire superstructure has been completed. Full-scale mock-ups of segments of the permanent tower are being fabricated to evaluate the sequencing and procedures for assembling these components in the field.

According to Gary Pursell, Caltrans Resident Engineer overseeing the SAS project, this complex project involves meticulous attention to detail. Engineers interpret plans, perform site surveys to ensure the precise placement of bridge elements, and oversee scheduling and quality assurance, to ensure that the new bridge will remain a sound structure for the next 150 years.

PIER E2 NEARS COMPLETION

Contractor Kiewit, FCI, Manson (KFM) continues work on the SAS marine foundations with pier E2, which will support the eastern end of the SAS road deck. In June a major milestone was reached with the completion of the welding, which secures the steel footing frame plates to the piles.

Two massive concrete pier columns, currently in construction, will rest on each footing. Each column will reach approximately 120 feet above the water.

SUPPORTING THE TOWER

424 tie-down rods will secure the SAS tower legs to the foundation at T1.



T1: SUPPORTING THE MAIN TOWER

The marine foundation for the tower (T1) reached a major milestone in March with the arrival and placement of an enormous steel footing box. Equivalent in size to a basketball court, the footing box was fabricated near Corpus Christi, Texas by Kiewit Offshore Services, and sent by barge through the Panama Canal to reach the Bay Bridge work site several weeks later.

On March 17, the 2,100-ton footing box was lifted on to temporary supports by a catamaran barge. The lifting allowed a concrete slab to be placed under the bottom of the footing box. When the bottom slab cured, a local "coffer

cell", or tub with walls composed of steel sheets and support frames, was constructed around the footing box, with the concrete slab serving as its sealed floor. The coffer cell remained dry and kept the footing box from flooding, so that the steel rebar installation, concrete placement, and welding could take place when the footing box was submerged to the correct elevation. The welding of steel plates, which will connect the footing box to the piles, is continuing around-the-clock into the fall.

Following the completion of the welding, 424 high-strength tie-down rods will be installed and the entire footing box will be encased in concrete. The rods will eventually be used to help secure the SAS tower to the foundation.

According to bridge engineer Mark Vilcheck, until the tower is erected, T1 will look like a forest of rods reaching to the sky.

DOWN THE ROAD:

Construction of the SAS superstructure will continue with the building of false work to support the new road deck and 525-foot single tower. The erection of false work will begin at pier W2 at the western end of the span and continue around the tower to the end of the skyway. This false work will support the road deck until the span's main cable is installed near the completion of the project. A total of 28 lifts will place the road deck segments on to the temporary support towers near W2. The same process will occur at the E2 marine foundation on the span's eastern end, with the erection of false work and the placement of the road deck segments by the shear leg crane barge that is currently being built.

The tower, which will rise from the T1 foundation, will be supported by four separate legs, which will each consist of four enormous sections. Each section, will be placed one at a time through a series of 16 "picks," of between 450 and 1300 tons.

As the road deck segments are lifted on to the false work extending from piers W2 and E2, cross beams, counterweights, and the pedestrian and bike path segments will be installed. A temporary back span and main span catwalk will then be used to install the span's main cable. Seventeen thousand wires will be grouped into 137 bundles of 125 wires each, which will compose the main cable, which will be 3.5 feet in diameter. Finally, the suspender cables will be installed and the deck weight will be transferred from the temporary towers to the main cable.



SUBMARINE CABLE INSTALLED NEAR TREASURE ISLAND

A milestone was reached in August with the successful installation of a double-circuit electrical submarine cable. The new cable, which runs between Treasure Island and the Oakland (Touchdown?), was installed in three weeks.

The existing underwater cable needed to be replaced due to its proximity to foundation work for the new Oakland Touchdown.

The contract was awarded through the competition bid process to Manson Construction, which submitted a bid of \$9.6 million. Prysmian Cables & Systems of Seattle, Washington furnished and installed the cable. The company won commendation by Caltrans' inspectors and an independent testing firm, which performed a discharge leak test during installation.

Project partners included the City and County of San Francisco, which shared the cost of the contract with Caltrans, the San Francisco Public Utilities Commission, and the Treasure Island Development Authority.

The submarine cable work is one in a series of Bay Bridge Seismic Safety Projects to strengthen the bridge.

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SKYWAY PROJECT NEARS COMPLETION

The mile-long elevated viaduct of the new East Span, or Skyway, is structurally complete. All 452 pre-cast concrete segments—the largest of their kind ever cast—have all been placed. The two enormous steel box girders, each weighing 1,700 tons, were lifted last year. They represent the heaviest lifts in California history. The girders will eventually connect to the SAS, which is currently under construction.

The parallel decks of the Skyway have been designed for earthquake stability—with enormous foundations supporting the concrete segments, and with piles reaching as much as 300 feet below the water's surface to anchor in stable soils.

For additional stability and resistance during an earthquake, the piles are driven into the soil at an angle through a process called "battering." The piles weigh up to 365 tons each and were driven by one of the world's largest hydraulic hammers.

Another key seismic safety element of the new span are the twenty hinge pipe beams, which were fabricated to precise tolerances by Transbay Steel Corporation. The hinge pipe beams are designed to slide within their sleeves in order to accommodate the movement caused by thermal expansion, or by seismic activity. They are specifically designed to absorb the energy of an earthquake by deforming in the middle or "fuse" section. This will minimize damage to the main structure. The damaged section can later be replaced.

Sixteen of the 20 hinge pipe beams have been installed. The four remaining beams will be installed in the fall.

The remaining work includes the installation of electrical equipment on the maintenance platforms located between the parallel roadways, the completion of barrier rail work on the bicycle/pedestrian path, and the application of a polyester deck overlay on the westbound roadway.

The Skyway is slated for completion in December 2007.



WEST APPROACH

Work on the West Approach is nearing completion. The project involved the removal and replacement of a one-mile section of freeway connecting San Francisco to the bridge's West Span. The project also included the replacement of on- and off-ramps.

Work continues on the replacement of a 1,000-foot section of the westbound upper deck, which was demolished last Labor Day weekend. The work will ultimately result in a wider freeway approach and broader shoulders in both directions.

A major milestone was reached in March with a traffic shift to a temporary alignment to facilitate the demolition of the final 3,000-foot section of the existing freeway structure from 2nd Street, near the historic Clocktower Building, to 4th Street. The detour routed eastbound traffic below the new westbound lanes of the West Approach.

The demolition work was completed in April through a heavily consolidated schedule, which was implemented in order to minimize inconvenience to local residents and businesses. The new eastbound structure is currently being built.

The completion of the entire \$429 million West Approach Project is anticipated for 2009.



A Message from Bart Ney, Bay Bridge Public Information Officer

One of the main goals of this publication is to chronicle the construction of the new Bay Bridge as it unfolds. We aspire to provide a behind-the-scenes view of the many mega projects that define seismic safety work on the Bay Bridge. We would also like to introduce you to some of the many team members who perform this work.

This issue, which features the upcoming work over Labor Day weekend, also serves another purpose. We are using the electronic version of Bay Bridge News as one of the many avenues of communication to inform motorists not to drive this Labor Day weekend. We hope that you will help us spread the word.

In this newsletter you will also find articles on the Skyway and West Approach projects as they near completion, an update on the world's largest Self-Anchored Suspension bridge, and a short piece about the early completion of the new electrical cable supplying power to Treasure Island.

As the work on the new East Span accelerates, we are pleased to announce that we have recently opened a new Public Information Office on Treasure Island. The office will help give direct access to the people and businesses on the Island, as well as to serve motorists and the general public throughout the Bay Area. We hope that you will visit us.

Wishing you a safe and pleasant holiday weekend.

Bart Ney

Public Information Officer
San Francisco-Oakland Bay Bridge



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