

**THE SAN FRANCISCO-OAKLAND BAY BRIDGE:  
BASIC REFORMS FOR THE FUTURE**

**FINAL REPORT**

**July 2014**

**Prepared by News to the Next Power©  
For the California Senate Transportation & Housing Committee  
The Honorable Mark DeSaulnier, Chair**

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## INTRODUCTION

This final report results from a request by Senator Mark DeSaulnier, Chairman of the Senate Transportation and Housing Committee, searching for an answer to a basic question: Why was the eastern span of the San Francisco-Oakland Bay Bridge \$5 billion over budget and delivered ten years late? The preliminary report, delivered at a committee hearing on January 24, 2014, took three months to compile and incorporated dozens of in-depth interviews and thousands of pages of related documents. This final report incorporates more interviews and the examination of many more documents over an additional five months.

This report is not an engineering audit and makes no findings on topics such as the quality of deck welds, anchor rods, corrosion, or foundations. Rather, it is an in-depth look into how key decisions about vital issues were made and what lasting lessons can be learned from the process in order to avoid future cost overruns and delays of this magnitude.

In addition, it is very important to state explicitly that no one in this inquiry has said the bridge is unsafe. Even the most aggrieved critics involved in the construction say they have confidence in the integrity of the structure. But the vast majority of the same men have separately agreed that portions of the new bridge will likely require retrofitting throughout the life of the span. Many of the engineers in this investigation say that in their professional opinion, the officially estimated 150-year lifespan is exaggerated.

For those reading this report offline, all references cited in footnotes will be found in the online version at <http://stran.senate.ca.gov/informationalhearings>. Reference materials not available online will be found at the Metropolitan Transportation Commission Library in the Bay Area. To view Studies & Documents, visit <http://stran.senate.ca.gov/baybridgeinvestigativehearing>.

## **PURPOSE AND SCOPE**

This inquiry aims to identify ways the government can better deliver massive public works projects by examining several aspects of the development and construction of the San Francisco-Oakland Bay Bridge.

There will, undoubtedly, be those with dissenting and critical views of this report. Although one might expect sharply different perspectives on the inevitable economic and political machinations that have been very much a major part of this story, there is a clear lesson learned here: Even engineers — civil, metallurgical, etc. — have blunt and passionate disagreements over their work. There is arguably as much art as science in designing and building a structure of the size, scope, and cost of the eastern span of the San Francisco-Oakland Bay Bridge.

While this inquiry aggressively sought responses to any included allegations, this is an independent investigation that for the first time gives voice to many who have kept silent for years.

There is also surprising consensus on much of what at first may appear to be conflicting perspectives. It is here Californians can hope — and reasonably expect — their stewards of the public trust will find ways for the construction of the spectacular new span to provide value beyond the essential task of carrying millions of people to work, to school, to the doctor, to their families, and to other vital functions of everyday life.

## EXECUTIVE SUMMARY OF MAJOR FINDINGS

### TRANSPARENCY:

***“The people of this state do not yield their sovereignty to the agencies which serve them. The people, in delegating authority, do not give their public servants the right to decide what is good for the people to know and what is not good for them to know. The people insist on remaining informed so that they may retain control over the instruments they have created.”*** – *From the introduction to California’s Bagley-Keene Open Meeting Act.*

In the course of conducting this investigation, many people raised serious concerns about the construction of critical components of the eastern span of the San Francisco-Oakland Bay Bridge. Some describe concerns with welds in the roadway decks and the superstructure holding them up. Others have raised concerns regarding the large bolts securing critical bridge components and corrosion of the bicycle/pedestrian path. Still others have raised questions regarding the landmark tower and deck known as the Self-Anchored Suspension span (SAS).

It is the finding of this investigation that those involved in overseeing the project have attempted to keep many serious allegations quiet, rather than dealing with them in an open, businesslike manner. This behavior is demonstrated in many of the controversies that have come to light largely through an enterprising news media rather than public disclosure by government agencies.

Furthermore, this inquiry suggests that this is part of an institutionalized, if not malicious, lack of transparency in the project.

Some of the consequences of the desire for confidentiality in overseeing and managing the construction of the bridge might not have been intended. But after almost a decade of work, it is apparent that adjustments toward more transparency will benefit everyone. Indeed, since the issuance of the preliminary report and the subsequent public hearings by the state Senate, key decision makers have reversed some of their earlier stands defending the confidential nature of oversight meetings and have agreed to more transparency.<sup>1</sup>

<sup>1</sup> The Toll Bridge Program Oversight Committee (TBPOC) reversed itself on its statutory-empowered ability to meet in secret. At the end of April 2014, the TBPOC announced plans to open up all TBPOC meetings to the public, and did so on May 6, 2014.

Californians not only deserve to know what they want to know about the bridge project in order to make accurate, sober judgments; there is a far more grave potential consequence to the lack of transparency that has plagued the project from the start: a lack of accountability.

#### CONCEALMENT AND RETRIBUTION ALLEGATIONS:

Accountability is seriously compromised if an organization not only fails to reveal the warnings of its employees but, still worse, punishes those employees for following their professional responsibilities and calling attention to their serious concerns about proper construction and oversight practices. If anything, implied retribution gives the appearance of a cover-up.

It is the unavoidable conclusion of this inquiry that there has existed a troubling pattern of critical construction perspectives that ran contrary to those of the top bridge managers. When silencing people didn't seem sufficient, it appears those top managers ultimately punished dissidents by either dissolving their contracts or transferring them to other assignments. At least nine top bridge engineers, scientists, and other distinguished bridge construction experts who worked on the project have similar stories of being gagged and banished.

Moreover, these men have not only become fearful of disclosing information about this public business of properly delivering the bridge; they have consistent tales about admonishments by management to avoid keeping written records of the discords that could help document — or dismiss — their criticisms and concerns.

Although top bridge managers refute the assertions, the issue must be aired. The alleged pattern of punishment and cover-up not only gives pause to the vast majority of worthy Caltrans employees who dedicate their professional lives to building and maintaining California's vital transportation network, but it greatly reinforces a cynical perspective of many Californians toward the California government, often personified by the orange Caltrans colors visible across the vast state.

## FIDUCIARY RESPONSIBILITY:

Although Caltrans originally told Californians the bridge would cost less than \$1.4 billion dollars to build, that cost has grown by some 400 percent to almost \$6.4 billion.<sup>2</sup>

How the government-appointed stewards of the bridge construction have spent much of that money has been largely documented — albeit in haphazard, piecemeal fashion — during the years.<sup>3</sup> There can be little argument that the explanations for massive cost overruns until 2005 were directly attributable to time-consuming design changes, political delays, unfavorable market conditions and some world events beyond control. Yet the largely unexamined history of the bridge costs since the significant change of management in 2005, in which the Legislature created the Toll Bridge Program Oversight Committee (TBPOC) to manage the project, also gives pause.

This inquiry has concluded that bridge managers spent significant additional sums of taxpayer money on contracts that were already signed but which contractors were not fulfilling. This extra money often went to contractors who were not meeting their deadlines. In fact, these extra millions of dollars often did not put the contractors back on schedule; instead, they merely somewhat shortened the delays.

Some of the bridge's top managers unabashedly declare it was their responsibility to spend extra millions to ensure completion of an earthquake-safe lifeline span<sup>4</sup> as promptly as possible, especially in light of the years of accumulated delay by the time the TBPOC took over in 2005.

This is an important point. Yet, if the bridge managers were comfortable with this position, then it is unclear why they needed to have closed-door meetings and lack of full disclosure when approving these extra millions spent on what bridge managers euphemistically refer to as “incentives,” “accelerations,” and “mitigations.”

<sup>2</sup> [Link to Caltrans documents](#)

<https://www.mediafire.com/folder/58q6560zurnzb4l,aj44n35w8u8omsf,aj44n35w8u8omsf/share> and <http://trid.trb.org/view.aspx?id=659552>

<sup>3</sup> The best single place to see detailed tables on the costs associated with the bridge may be found in the Results Group study of January 2005 ([link to Studies & Documents page](#)).

<sup>4</sup> [Link to definition of lifeline span](#) <http://www.dot.ca.gov/dist4/sfobbdeis/deis1.html>

Major political events shortly before the creation of the new management structure accounted for a significant share of the increased cost of constructing the bridge. However, millions of additional dollars were approved for what some have described as “scope creep” and “prettying up the bridge.”<sup>5</sup> These include items such as special lighting and decorative palm trees. While it is true that lighting technology has changed a great deal since government authorities approved the first bridge designs in the early 2000s, the decision to spend millions on these additional elements for the bridge should have been made openly and with public input.

## TWO DOZEN YEARS OF PLANNING AND BUILDING:

Planning, politics, and unexpected events are all often — and correctly — cited as primary causes of the extraordinary length of time taken to complete the San Francisco-Oakland Bay Bridge for use by everyday traffic.

Documents clearly show that from almost the very beginning of the planning process, there has been controversy. For example, the late structural engineer T.Y. Lin (who recommended the cable-stayed design), in an oral history of the bridge available at the University of California, Berkeley, called the SAS decision a “monument to stupidity.” He asserted that at a 24-member Engineering Design and Advisory Panel (EDAP) meeting two weeks before the final design was selected, more of the panel indicated a preference for the cable-stayed bridge than the SAS. Two weeks later, with 19 members attending, the critical 12-7 vote for the SAS took place. And although a detailed study of the minutes of these meetings does not conclusively explain what happened, Mr. Lin recounted in the oral history project that he was told the extra cost would be “at least \$50 million more. Terrible! At least, it probably will come out \$70 [million] or more.” Mr. Lin, it should be noted, had sold his company and was bitter about the SAS design choice.<sup>6</sup>

The bridge’s current managers are quick to suggest there are two major construction phases to the project, the first characterized by political and engineering management chaos and massive cost overruns. The second phase

<sup>5</sup> Denis Mulligan, Golden Gate Bridge General Manager and CEO.

<sup>6</sup> More can be found on the University of California website:

<http://content.cdlib.org/view?docId=kt4w1003s9;NAAN=13030&doc.view=frames&chunk.id=d0e16468&toc.id=d0e16286&brand=calisphere>

began after the Legislature created the TBPOC<sup>7</sup> in 2005, and was intended to get the bridge on schedule, within budget, and under control.

It is the finding of this investigation, however, that there were cumulative years of delays even after the TBPOC took control of the bridge project. These delays are largely attributable to crises often beyond the TBPOC's control, such as the lengthy and costly work stoppages during construction of the critical connection of the eastern span to Yerba Buena Island and of the SAS tower and bridge deck.

To be sure, some of the longest delays were not the fault of the bridge builders. Rather, they were the product of political infighting at the very highest levels of California state government.

But this investigation has also found clear evidence of attainable management practices — some of which are already quietly going into place — that may have obviated many of the critical delays suffered during the last two dozen years. These are described more completely below, as are the other principal findings reported in this executive summary.

<sup>7</sup> The TBPOC is composed of the heads of the California Department of Transportation (Caltrans), the Metropolitan Transportation Commission (MTC), and the California Transportation Commission (CTC).

## Chapter 1: TRANSPARENCY

The question of transparency on the construction of the new eastern span of the Bay Bridge is inextricably linked to many of the problems with the bridge that are recounted in recent news stories and being discussed today.

In the absence of readily available public information on problems with this project as they arise, Californians instead read newspaper stories about the bridge's problems, which prompt responses ranging from unsupportable fears to fuzzy urban myths.

For example, there are people — some in state government and at our best universities — who have lingering concerns that the new bridge may collapse in the next big earthquake. An example of a common myth is that there are two separate decks instead of one roadway because environmental activists insisted two would provide more sun for eelgrass in San Francisco Bay.

The proliferation of speculation in place of quality public information serves no one. Not the men and women who built the bridge and gave much of their lives for this lifeline structure. Not the people who managed the construction of the bridge and decry rumors and what they consider misleading or even downright sloppy news stories.<sup>8</sup> Not the California state government, charged with carrying out its fiduciary responsibilities to the public. And certainly not the people of California, who have every right to know what their money and sacrifice have bought them. There is an antidote for this problem: open access to public information.

Top bridge managers — engineers and non-engineers alike — have been consistently confounded about what information is important and interesting to the public. More than a few involved at all levels of the project agree — usually off the record — that the lack of effective communication is a known issue, and that better communication is needed, but they are at a loss as to how to accomplish this goal. This report offers basic starting points in its Conclusions and Recommendations section.

If there is one consistent finding of this inquiry — from the beginning of the Bay Bridge project almost a quarter of a century ago to the opening of the span to

<sup>8</sup> MTC Executive Director and TBPOC Chairman Steve Heminger says, “there were so many manufactured and fallacious controversies [that the public] can’t tell those from the real ones.”

traffic over Labor Day weekend 2013 — it is that there has been a crippling lack of public transparency. This investigation discloses some of the most vivid examples.

### *BRIDGE DECK WELDS*

The most notable example of limited transparency and the related quality issues involves the welds in the bridge deck panels and supporting boxes underlying the bridge's roadways.<sup>9</sup> Although there were a few brief news accounts roughly four years ago describing some of these concerns, bridge managers quickly dismissed them, and the issue fell from the public's attention.

This inquiry has found ample evidence that the concerns with the welds briefly appeared and then disappeared less because of any lack of merit than from an ongoing lack of public disclosure, enabled in part by extraordinary exemptions for the TBPOC from the Ralph M. Brown Act and the Bagley-Keene Open Meeting Act — laws guaranteeing open public meetings for most government actions in California. In addition, there are clauses in many Caltrans contracts punishing candor and rewarding secrecy from contractors.<sup>10</sup>

### *QUALITY ASSURANCE EXPERTS DISCOVER WELDING CRACKS*

Concerns regarding the quality of the welds began shortly after the state awarded the prime SAS contract to American Bridge/Fluor (ABF)<sup>11</sup> in 2006. ABF, in turn, planned to sign a supplier subcontract with Shanghai Zhenhua Heavy Industry Co., Ltd. (ZPMC)<sup>12</sup> to fabricate the steel decks and the SAS tower.

As a standard protocol, before approving the contract Caltrans required its independent quality-assurance consultant to perform an audit of ZPMC before allowing it to take on the critical deck and tower fabrication subcontract.<sup>13</sup> This

<sup>9</sup> To be explicitly clear, this has nothing to do with what ultimately proved to be false charges of faulty welds in the bridge foundations — charges Senior Principal Engineer James Merrill and quality-assurance firm MACTEC Engineering and Consulting, Inc. had earlier investigated and found to be false.

<sup>10</sup> See page 23

<sup>11</sup> [Link to ABF http://www.fluor.com/projects/pages/projectinfopage.aspx?prjid=2](http://www.fluor.com/projects/pages/projectinfopage.aspx?prjid=2)

<sup>12</sup> [Link to ZPMC http://www.zpmc.com](http://www.zpmc.com)

<sup>13</sup> Caltrans' Materials Engineering and Testing Service (METS) branch established this protocol after a near disaster at the Carquinez Bridge where ZPMC and its subcontractor were hired by Caltrans to make and deliver 250,000 critical bolts. When the bolts arrived at the construction site, Caltrans found they were wrongly constructed — in part because a Caltrans employee had

quality-assurance firm was then known as MACTEC,<sup>14</sup> an internationally recognized engineering firm that put one of its top people — Senior Principal Engineer James Merrill — in charge of a team of engineers and technicians. Mr. Merrill is an expert in his field and is a member of the distinguished panel<sup>15</sup> that establishes codes and standards for structural welding.

Mr. Merrill and his team gave ZPMC a “contingent pass,”<sup>16</sup> finding that the Chinese company had the infrastructure to adequately accomplish the Bay Bridge work, but that it lacked the necessary experience and personnel. Mr. Merrill says Caltrans was taking “great risk” in letting ZPMC do the work. Bridge managers executed the contract despite MACTEC’s warning, stating that ZPMC had addressed all the concerns raised in the audit.

MACTEC engineers almost immediately started finding significant numbers of cracks in the deck welds underway at the Shanghai China fabrication factory. In a later interview, Mr. Merrill said he was “alarmed” by what he found.

Mr. Merrill’s team had also found another unsettling quality problem that has been very much in the news during the last year and a half — a finding underscoring concerns uncovered in the course of this investigation. This inquiry discusses that quality problem in Chapter 2.

### *CONTRACT AND CODE CALLS FOR NO CRACKS IN WELDS*

Mr. Merrill, in an interview conducted at the request of the state Senate, points out the ABF/ZPMC contract requires that there be no cracks in any of the welds. Indeed, welding codes have that same standard for similar critical components.

“We found hundreds of cracks,” Mr. Merrill stated in an interview at his San Diego engineering office. Moreover, those were just “positive” sightings — fissures seen with the naked eye. More sophisticated quality-assurance tests with tools such as those used in Phased Array Ultrasonic Testing would likely reveal more cracks.

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earlier accepted them “as is.” All of the 5-inch-long, 2-inch-wide bolts had to be rejected and remade. This cost an additional \$350,000.

<sup>14</sup> MACTEC was subsequently bought by engineering firm AMEC. [Link](#)

<sup>15</sup> [Link to American Welding Society](#) <http://www.aws.org/technical/d1/>

<sup>16</sup> Caltrans defines a contingent pass as an instance where “Reasonable plans are in place to make necessary changes to the facility prior to the start of work on this project.” All contingencies must be corrected as determined by a Caltrans re-audit prior to fabrication and must receive a status of PASS.

MACTEC, knowing the terms of the contract called for no cracks, rejected the panels, throwing the project into a potentially serious time delay, as first noted in TBPOC minutes of September 2008. On March 5, 2009, the TBPOC minutes note “the situation is calling for drastic measures.” Then on May 19, 2009, the minutes record that “The TBPOC expressed concern over the lateness of this problem discovery, right before shipment, which does not inspire confidence.”

In fact, at the end of the conflict, Caltrans engineers say the Bay Bridge suffered a long delay because of the welds issue. There was also a financial cost that Metropolitan Transportation Commission (MTC) Executive Director and current TBPOC Chairman Steve Heminger estimates eventually grew to \$100 million.

### *BRIDGE MANAGERS PUSH BACK*

Mr. Merrill says his Caltrans supervisors told him he was being “too rigorous” in his findings, which then led to Caltrans making an unprecedented change.<sup>17</sup> Traditionally, quality assurance experts such as MACTEC engineers report their findings to the Materials Engineering and Testing Services (METS) branch of Caltrans, located roughly five miles from Caltrans headquarters in Sacramento. Caltrans separated the quality oversight from the construction branch to help avoid conflicts of interest.<sup>18</sup> Staff within METS, headed by Deputy Division Chief Philip Stolarski, agreed with the MACTEC weld findings. “For the Chinese, the weld standards were ‘suggestions,’” Mr. Stolarski stated in an interview. “For Caltrans, they were a binding agreement.”

<sup>17</sup> TBPOC Chair and MTC Executive Director Steve Heminger gave his version in the January 24, 2014, state Senate hearing: “We ran the risk of this endless (loop) of inspection/rework, inspection/rework, getting more refined equipment so you can find smaller and smaller cracks. ... We also, as a result of learning things in the field, realized that we needed a procedure so that we could say ‘yes’ and not just point to the code and say, ‘What the code shows you is a picture of a weld with no imperfections at all.’ Well if you put that in your contract, you’re going to be at it forever because steel decks have cracks in them. Concrete decks have cracks in them. The issue was not whether there’s a crack there, it’s whether it matters; it’s whether it’s material; it’s whether it’s likely to propagate, and so on and so forth, and that requires engineering judgment, which is why I think you have the kind of passionate debates that people have. But I think this debate, even though passionate and even though it had dissenters, I think this debate was resolved in the open with a lot of independent peer review, and I think we got to the right place.”

<sup>18</sup> The former head of Caltrans Risk Assessment, John Tapping, now doing the same job for the High Speed Rail Authority, noted in an interview that this separation was “important.”

In May 2009, shortly after the standoff between MACTEC and bridge managers, top Caltrans executives dissolved the separation between quality assurance and the construction team in China.<sup>19</sup> Caltrans executives instructed MACTEC and Mr. Merrill to stop reporting to METS and instead report directly to the construction team, headed by Principal Construction Manager Peter Siegenthaler and Program Manager Tony Anziano. Merrill stated in an interview that he believed the project management was more concerned with staying on schedule than anything else.

Finally, MACTEC, with Mr. Merrill heading the team, was removed from the Bay Bridge job entirely when Caltrans chose not to renew their contract. This is further discussed in the Concealment and Retribution Allegations section of this report.

### *INTERNAL DISSENT IN CALTRANS*

Caltrans Civil Engineer Douglas Coe, celebrating his 25<sup>th</sup> year with the department in 2014, went to China in March 2007 to work as the construction manager for the Bay Bridge project. In a recent interview, Mr. Coe stated that from the start, he was also concerned about the welds.

In an interview for this inquiry, Mr. Coe stated that the hundreds of cracks found in the welds soon mounted into the thousands. “The Chinese were not catching stuff,” he says. Mr. Coe says he was also concerned that top bridge managers were pushing aside Mr. Merrill’s findings. “Normally, we would have stopped [fabrication],” he says. Mr. Coe recalls feeling “pressure not to stop. I said, as [a public employee with a] fiduciary [responsibility], I have a duty and they have a duty to do this right. And as a civil engineer I have a professional obligation as well.”

Mr. Coe says he insisted that if Caltrans was going to permit the Chinese to violate the terms of the contract, then the bridge managers at least had to write a change order allowing the cracks to stand. Caltrans eventually did just that.<sup>20</sup>

Mr. Coe and Mr. Merrill say Mr. Siegenthaler instructed Mr. Merrill to apply less rigorous weld quality specifications for his team’s quality assurance inspections. “Essentially what he was telling Jim (Merrill) was, ‘don’t find cracks,’”<sup>21</sup> Mr. Coe

<sup>19</sup> Will Kempton was Caltrans director at the time.

<sup>20</sup> [CCO 89 in Studies & Documents](#)

<sup>21</sup> This refers to careful inspection along welds lines marked every three inches, the primary worry being cracks that begin small but later propagate or “run.” Merrill confirms these conversations.

says. “Pete (Siegenthaler) wanted the problems to go away. The Chinese were a year and half behind schedule and ended [up] being about two years behind.”

Even more disconcerting, Mr. Coe says, was catching Mazen Wahbeh, the structural material representative for MACTEC, outright “lying” about the inspection of welds that connected the final deck panels. Dr. Wahbeh later became the CEO of Alta Vista Solutions, the consulting firm that took over the quality-assurance work on the bridge after MACTEC’s contract was not renewed.

“I’m mad as hell that the department [Caltrans] put me in a position to have to say this. It’s a loss of public trust,” Mr. Coe says, “but if that bridge starts to crack in five years, it’s all going to come out.” He adds, referring to the code of ethics for professional engineers, that the situation is contrary to “public welfare.”<sup>22</sup>

### *A CONTRASTING SET OF PERSPECTIVES*

Mr. Siegenthaler and Dr. Wahbeh have a different memory of these events, as do Mr. Anziano and Mr. Heminger. All four bridge managers state the cracks were reparable, are largely fixed, and that the bridge is safe. Mr. Siegenthaler and Dr. Wahbeh explicitly refute Mr. Coe’s assertions regarding the inspection of deck welds.

Mr. Siegenthaler, who soon afterwards retired from Caltrans to take an executive position with MACTEC competitor and eventual bridge oversight replacement firm Alta Vista Solutions, says, “MACTEC was not providing the inspection services when needed.” He says he was “alarmed” by the MACTEC situation and attributed much of the construction delay to the MACTEC team refusing to stay late in the workday to approve fixes on the cracked welds.

Mr. Anziano says he doesn’t recall having any direct talks with Mr. Merrill or MACTEC, though Mr. Merrill says conversations with Mr. Anziano were frequent and difficult. In fact, Mr. Anziano states, “I did not ever get the impression that anyone there was alarmed. Issues were identified and routinely addressed.” Mr. Anziano and Mr. Siegenthaler both say the change of reporting in quality assurance was simply “streamlining” that made sense for a complicated job site on the other side of the Pacific Ocean from METS.

<sup>22</sup> [Link code of ethics for civil engineers http://f2.washington.edu/cpo/cpoutlook/code-ethics-civil-engineering-vs-construction-management](http://f2.washington.edu/cpo/cpoutlook/code-ethics-civil-engineering-vs-construction-management)

Mr. Anziano's recollection of events is also different from Mr. Coe's. Mr. Anziano says he does not recall demands for changing the welding standards. Mr. Anziano does recall ABF and ZPMC being "extremely upset" because of what they thought was Caltrans "throwing rules out the window."

Mr. Coe, like Mr. Merrill and all of the other dissenting voices described in this report, was removed suddenly from the Bay Bridge project by Caltrans leadership.

Regardless of the cause, the delivery of the panels fell behind schedule and TBPOC approved contract change orders (CCOs)<sup>23</sup> to try to prevent further delays. Mr. Heminger says, "ZPMC was in the strong position to bargain with clients. That was the business model they were familiar with."

In an attempt to resolve the controversy, bridge managers selected and hired a group of experts to review the welding issue. These experts subsequently gave the welds their approval. Critics have since questioned the experts' conclusions, however.

Keith Devonport, the fabrication manager in China and an engineer with extensive experience in bridge construction — especially in Asia — was an appointed guide at the worksite for Alan Cavendish-Tribe, the author of the experts' study asserting the adequacy of the welds. At the time, Mr. Devonport worked for a contractor named Lim & Nascimento Engineering. In a recent interview, Mr. Devonport said Mr. Cavendish-Tribe ignored the problems shown him and "sugar-coated" his report. "He must have been on another project," Mr. Devonport concluded.

Mr. Cavendish-Tribe responded to this criticism via email, stating: "Mr. Devonport and I did visit the ZPMC works together in the early days of the tower and OBG<sup>24</sup> fabrication, during which time there were numerous issues, as anyone would expect on a project of this scale; hence the purpose of welding trials, mock-ups, etc. During my many oversight visits I would talk with many of the engineers and inspectors, which as you know is important to obtain an accurate and up-to-date understanding of all the issues and to observe [any problems] first hand. The issues which were close to the hearts of staff, such as Mr. Devonport, were

<sup>23</sup> A contract change order typically arises when either the contractor or agency (such as Caltrans) seeks to amend the contract. Oftentimes it increases costs.

<sup>24</sup> OBGs, or Orthotropic Box Girders, are the sections holding up the steel panels that are directly under the pavement drivers cross on the bridge. There are 28 total sections, 14 for each deck. They were fabricated in China, then shipped to the Bay Area and lifted into place. An excellent graphic interface may be found at <http://baybridgeinfo.org/sas#33>

addressed through additional work and subsequently inspected in accordance with the contract specification and AWS D1.5 [an American welding standard]. The book you reference in your email, ‘The Project Team Response to the QA/QC Expert Panel Recommendations,’ considers all the welds and provides the definitive summary of the evidence, thus confirming the quality of the bridge and its compliance to the contract specification and AWS D1.5.

“The introduction of stage inspection, known on this project as ‘The Green Tag Process,’ through CCO 077 was an important turning point as this gave both the department and the contractor the ability to manage quality in to the project. Unfortunately Mr. Devonport returned to Oakland around this time and therefore did not witness the benefits this process brought to the project.”

### *WELDING CRITICISMS MOUNT*

Mr. Devonport is now retired and lives in his native northern England. In an interview, Mr. Devonport stated that he was in China at the ZPMC fabrication facility when he first became concerned about the quality of the welds for the bridge deck panels.<sup>25</sup> He says he was also troubled by the overall quality assurance work performed by Alta Vista Solutions after it replaced MACTEC. In June 2009 he wrote to Mr. Anziano about his concerns.<sup>26</sup> Although he says Mr. Anziano instructed him to not write down his findings because they could become public documents, he did so in his private diaries, which he kept and has made available for this investigation.

Mr. Devonport, as others, witnessed problems in fabricating the bridge decks, starting with the first critical element: the welders. As the MACTEC pre-audit warned, too many of the ZPMC workers were untrained and, apparently, resistant to training. “After initial resistance and procrastination by the contractor, the training eventually got underway, but was never a success because of very poor welder attendance rates,” stated Mr. Devonport. “There were days when the welding instructor reported very poor attendance rates — one or two people — and other times when there was a complete ‘no-show’ on behalf of the welders.”

Mr. Devonport says he told the bridge managers that although phased array testing was an appropriate inspection protocol, the proper means of ascertaining the extent

<sup>25</sup> The particular type of crucial weld in question is called “transverse,” because it crosses the adjoining deck panels perpendicularly. A longitudinal weld, also at times in question, runs along the seam.

<sup>26</sup> [Studies & Documents](#)

of the cracks in the welds would be to use an ultrasonic testing method known as Scanning Pattern D at a 45-degree tilt. Initial usage, in Mr. Devonport's words, was telling: The testing "method identified a big problem." His concerns included the possibility that cracks in the transverse deck welds could propagate. But "Tony [Anziano] instructed [us] to make clear to ABF and ZPMC that we do not intend to use 45-degree probe Scanning Pattern D, and that we can stand behind the quality when the job arrives in California."

Deeply troubled by this, Mr. Devonport called upon The Welding Institute (TWI), an independent welding consultant group in Cambridge, England. Mr. Devonport arranged for Mr. Anziano and other top bridge managers to meet with TWI during a separate trip to the UK. The European standards for welding are more malleable, Mr. Devonport notes, so Mr. Anziano was "keen" to go. Mr. Devonport says TWI's conclusions were not what Mr. Anziano wanted to hear; he says TWI concluded that "For these welds to crack there must have been serious disregard for the welding procedure."

It was shortly after this that Caltrans reassigned Mr. Devonport, like Mr. Coe before him.

John Kinsey was a principal scientist and expert in non-destructive testing who started working in Shanghai for MACTEC in 2006. When Caltrans did not renew the MACTEC contract, he went to work for Caltrop and Alta Vista Solutions. He supervised roughly 45 inspectors responsible for making sure the fabrication met contract and code specifications.

Mr. Kinsey, who lives in China and still works for Caltrop after that company's falling out with Alta Vista Solutions, submitted to an interview after a formal request from the state Senate. Of the Bay Bridge welding at ZPMC, Mr. Kinsey says he has "never seen so many indications [of cracked welds] on any job I've ever been on — and I've been on just about every bridge in California since 1999." In fact, the only three major bridges he hasn't worked on in the state are the Antioch, Dumbarton, and Golden Gate.

Mr. Kinsey agrees with others that there were problems with the big boxes called OBGs that hold up the decks. "The first several OBGs had lots of cracks. The repairs were adequate if ground smooth and they used Scanning Pattern D to find them. They did some, some they didn't." In all, he estimates only 50 percent of the welds in the OBGs he inspected were welded correctly.

Mr. Kinsey says he brought this to the attention of key bridge managers Mr. Anziano, Ken Terpstra, Bill Casey, and then Alta Vista Solutions CEO Dr. Wahbeh. Mr. Kinsey's comments led to his inevitable conclusion that Mr. Coe was telling the truth about Dr. Wahbeh lying to him, "because I know we told him (Wahbeh) they were not inspected with Scanning Pattern D. A couple of times."

Mr. Kinsey was reassigned after continuing to voice his concerns.

David McClary arrived at the ZPMC fabrication site in China in 2006. As a MACTEC quality assurance supervisor, he oversaw 35 inspectors assigned to ensure the quality of the welds. In an interview, he says it soon became apparent that the transverse welds holding the OBGs beneath the roadway were insufficient. Mr. McClary says Alta Vista Solutions executives knew this, as did many others. He was particularly concerned about the welds at the bottom of one box loading on a ship bound for San Francisco Bay.

Mr. McClary was witness to a phone call from Mr. Anziano to Mr. Coe in which Mr. Anziano decided to not let Mr. Coe inspect the OBGs anymore. Soon after that, Mr. McClary began to feel as if *he* were the one no manager wanted to see. Subsequently, Mr. McClary was also removed from his supervisory role on the project.

Mike Forner was a principal engineer on the bridge project and first went to the ZPMC fabrication facility in Shanghai in 2007. In a recent interview, Mr. Forner says the welds were unacceptable<sup>27</sup> and that 200 or so of the deck panels were appropriately rejected. He is quick to say that noted expert John Fisher of Lehigh University in Bethlehem, Pennsylvania, using data provided by the bridge managers, has contradicted the many critics and has stated the welds are sufficient. Mr. Forner also added, "Pete (Siegenthaler) was damn lucky Fisher came to that conclusion."

Meanwhile, Mr. Forner brought his concerns to Mr. Anziano in mid-2008. He says he met a hostile reaction and that Mr. Anziano stopped returning his calls. Mr. Forner says Mr. Anziano would not even talk to him, although they were in the same office trailer on the Oakland waterfront. Concerned about the integrity of

<sup>27</sup> Forner and others note that a series of poorly welded Caltrans signs that collapsed in Southern California during the late 1990s and early 2000s led to a renewed concern by Caltrans welding experts to ensure all welding codes were followed. Moreover, subsequent news reports about the failures were very much on their minds as they uncovered welding problems on the Bay Bridge project.

the welds, Mr. Forner began to communicate directly with the middle management of the TBPOC, located in the MTC offices. Mr. Forner says when Mr. Anziano found out, he got more upset — but still would not listen to his concerns or talk to him. Mr. Forner says he had no choice but to voice his misgivings to the TBPOC’s middle operations managers, adding he would “hope to hell that he [Anziano] wasn’t at the MTC offices when I went there.”

“I wasn’t part of the decision making,” Mr. Forner concluded. “They probably didn’t like my decisions.” Mr. Forner transferred from the project back to the Bay Area, believing that his role in the project was diminished.

### *CHANGE ORDERS*

Gary Purcell was the resident engineer on the bridge project from 2006 until 2010, and had been involved with the project since 2002. The resident engineer is the liaison between contractor and owner — in this case between ABF and Caltrans. Mr. Purcell noted in an interview that it is not uncommon for Caltrans and its contractors to have different perspectives on quality control and quality assurance issues and to negotiate settlements regarding those sorts of disputes. But from the very beginning, Mr. Purcell saw some extraordinary — and troubling — differences.

At a kickoff dinner for Caltrans and ABF held at Scott’s Seafood Restaurant in Oakland in the spring of 2006, Mr. Purcell heard Mr. Heminger announce he had \$1 billion extra to spend on contingencies. “We all cringed. It seemed like a terrible idea to say that in front of a contractor, because it essentially communicated to the contractor that more money was available than the contracted amount.”<sup>28</sup>

Soon Mr. Purcell’s concerns about the availability of contingency funds began to materialize when issues such as the welding disputes arose between Caltrans and ABF’s supplier ZPMC. According to Mr. Purcell, the commitment of additional funds to the project ranged from small issues, such as two-day power failure in China that led to a \$10,000 claim, to major situations, such as CCO 160, related to the steel bridge delays in China which cost Californians an extra \$185 million. There are many examples; another standout for Mr. Purcell was a dispute over a

<sup>28</sup> Heminger recalls saying they had a \$900 million contingency, and that they were prepared under the right circumstances to trade some of that money for time to get the public project done as soon as possible.

clause in the contract with ABF stating they would get paid only after the bridge components arrived at the job site in the Bay Area. When ABF wanted the money up front and Mr. Purcell refused, top bridge managers had Mr. Casey take over the issue — and agree to the up-front payment.

When Mr. Purcell protested, Mr. Casey “pretty much told me to go f--- myself. He had Tony [Anziano] and Pete [Siegenthaler] in his pocket.”<sup>29</sup>

Finally, Mr. Purcell says that there were up to 13 people within Caltrans having separate negotiations with ABF, rather than one consolidated Caltrans voice, making negotiations “dysfunctional.” “In hindsight, it might have been better to take a harder line with ZPMC and insist on it being done right.”<sup>30</sup>

But at the time, Mr. Purcell says he was either instructed by people to “just settle” many disputes — threatening to settle them themselves if he balked — or the task was taken away from him. “I was just blown away,” Mr. Purcell says. “I was frank with Tony [Anziano]. I told him he was dead wrong.”

The issue, Mr. Purcell recalls, was always scheduling. “Anyone who was trying to get in the way of the schedule” was asking for trouble. As with all the others, Mr. Purcell says he soon found himself in hot water and reassigned from the project.

Rick Morrow has spent 36 years with Caltrans and is a noted bridge engineer. In 2004 he went to work on the SAS as a structure representative. By 2009 it was evident to him something was amiss.

One of Mr. Morrow’s key jobs was to take final responsibility for signing many CCOs. He takes pride in negotiating on behalf of Californians, saying he has locked horns with contractors for as little as \$2,000. But as he was increasingly asked to put his name to CCOs for structural steel fabricated in China that caused him consternation, he began to protest. In talks with higher-ups in Sacramento, he told them “things don’t look right.”

At first Morrow would sign the CCOs, writing “no technical objections” when he concluded the change orders were legally permissible but, he said, showed poor judgment. This would happen, for example, when bridge managers would accept work under exemptions such as “fit for purpose.” Morrow says his “focus was

<sup>29</sup> Mr. Casey has declined to address this issue.

<sup>30</sup> Mr. Anziano and Mr. Terpstra expressed agreement with this problem. Mr. Heminger did not.

more on quality, not on time.” As the situation deteriorated, he simply balked at affixing his professional credentials to the CCOs. After this happened around 10 times, “they didn’t even ask me” anymore. Instead, Morrow says, Chief Engineer Brian Maroney signed them.<sup>31</sup>

“I was not giving Tony (Anziano) the answers he wanted. On anything. Anything that detracted from getting it done on time or early was an issue.”

Mr. Morrow soon found himself out of the picture altogether, a situation more fully discussed in Concealment and Retribution Allegations.

### *A DIFFERENT PERSPECTIVE ON PUBLIC INFORMATION*

As mentioned previously, the Legislature created the TBPOC with an exemption from California’s essential open meetings acts. Some TBPOC officials have suggested that the legally required quarterly reports it sends to the Legislature create enough transparency for the management of the project. Although these reports are carefully prepared for accuracy and often have excellent graphics, they do not contain revelations or disclosures regarding issues such as the welds, bolts, bike paths, foundations, significant change orders, non-conformance reports, or conflicts such as expensive fights with other government agencies.<sup>32</sup> There is certainly never a word regarding concerns about the integrity of the work accomplished. Furthermore, these quarterly reports appear months after bridge managers have identified issues and sometimes resolved them without any public knowledge.

### *CONTRACT CHANGE ORDERS AND OUTSIDE STUDIES*

The Memorandum of Understanding that created the TBPOC requires the oversight board to approve all CCOs of \$1 million or more. While approval of these CCOs is documented in the TBPOC minutes, there is limited information about what they are for, and almost never a clear explanation of what the original contract called for or how a CCO would change the contract terms. Unlike most

<sup>31</sup> Mr. Maroney notes one of his many responsibilities is to make judgment calls to get projects completed. While praising Morrow for his work, he said he sometimes had to respectfully disagree with him — and others — and fulfill his job responsibilities by signing the change orders.

<sup>32</sup> There have been significant and expensive intra-agency fights between the TBPOC and other state programs such as the Department of Fish and Wildlife and the Department of Industrial Relations, not to mention the U.S. Navy/San Francisco controversies.

public bodies across California — including MTC itself — TBPOC appears to attach no supporting documents automatically or even routinely to any agenda items, including CCOs.

In addition, Caltrans does not have a readily accessible and comprehensive list of the nearly 1,500 change orders totaling more than \$1.4 billion that collectively altered the plans and finances of the bridge project.<sup>33</sup> This may become important, as there are ongoing rehab/retrofit contracts that have already begun. In fact, this inquiry has found MTC anticipates an \$855 million Bay Bridge rehabilitation budget, on top of a \$12 million-\$15 million annual maintenance budget already in place.

For this inquiry, Caltrans' former Chief Deputy Director Richard Land made most of the CCOs not only available but also assembled a short, clear database of the change orders among the 15 prime contractors working on the Bay Bridge. This may be the first time the public has had an opportunity to look at these critical reports.

Additionally, Caltrans has been unable to produce a comprehensive list of non-conformance reports (NCRs) documenting many of the problems contractors have encountered in meeting their contractual obligations.<sup>34</sup> In fact, some investigative news reporters have had to wait months before receiving copies of NCRs — as well as other documents — requested through the California Public Records Act (CPRA).<sup>35</sup>

Caltrans Director Malcolm Dougherty, in an interview for this report, readily conceded that Caltrans's document and retrieval system is “not as robust” as he would like and said he is taking steps to correct and modernize the situation.

<sup>33</sup> Some progress can be reported here and is discussed in the Conclusions and Recommendations section.

<sup>34</sup> There have been expensive contractor snafus never brought to public light and not eligible for an NCR because of management practices. A case in point was a \$1.5 million CCO for repairing the bike path in April 2013, even though not one single bike — or pedestrian — had used it yet. TBPOC Chairman Steve Heminger objected to paying the extra money but was told a contractor had used it for a staging area and created “wear and tear” that had to be fixed. Caltrans had already closed the contract, so the contractor was not liable for the damage and the taxpayers were left with the bill.

<sup>35</sup> The CPRA requires government agencies to fulfill requests *no later than* 10 days after receiving the inquiry.

Caltrans has had more success compiling documents for the process known as Notice of Potential Claims, in which a contractor declares a problem or issue has arisen.<sup>36</sup> Although these data are available, there is no clear way for the press or public to understand, navigate, or sort the information in meaningful ways.

Neither the press nor the public has access to bridge consultants as a matter of policy and practice. There are legitimate reasons for this public-information barrier, such as protecting proprietary information or encouraging competitive contracting processes. But the blanket language contained in standard Caltrans contracts prohibiting consultants' free speech may be too restrictive.<sup>37</sup>

Caltrans has spent \$13 million on a database ostensibly designed to track bridge welding, which, given the significant issues arising from the work, would be critical in any analysis. But seven years after development of the database began, it is still not available.

More than four years ago Caltrans agreed to pay \$9 million to engineering giant CH2M HILL to evaluate estimating, CCOs and dispute resolution board issues. That evaluation is also unavailable to the public.

There has been a significant, if uncounted and largely not curated, list of official studies, audits, and reports on the Bay Bridge. These reports presumably contain much valuable information, but most of them were created after the fact. In addition, they are more often than not written in specialized language not readily accessible to the public.

Caltrans' inability to make available a list of official reports, let alone critical CCOs and other project-specific documents, lends credence to the perceived and apparent lack of transparency in this project.

<sup>36</sup> [Link to Notice of Potential Claims site http://www.dot.ca.gov/Bay\\_Bridge\\_Docs\\_12-20-13/](http://www.dot.ca.gov/Bay_Bridge_Docs_12-20-13/)

<sup>37</sup> Standard Caltrans contracts contain this language: "The Consultant shall not comment publically to the press or any other media regarding this agreement or the Department's actions on the same, except to the Department's staff, Consultant's own personnel involved in the performance of the agreement, at public hearings or in response to questions from a Legislative committee." In addition, "The Consultant shall not issue any news release or public relations item of any nature whatsoever regarding work performed or to be performed under this agreement without prior review of the contents thereof by the Department and receipt of the Department's written permission."

## Chapter 2: CONCEALMENT AND RETRIBUTION ALLEGATIONS

There is no rationale for not addressing serious accusations of attempted cover-up. This inquiry has uncovered too much testimony fueling the cover-up charge to ignore. In context with the secretive institutional framework of the bridge management team and the revelations about construction controversies, the issue of potential concealment of critical information should be dealt with forthrightly and fairly.

Top bridge managers say only a smattering of dissidents out of a vast number of consenting experts have raised questions about the issues discussed in this report. The managers seem unreasonably defensive, and suggest that their word, alone, should be enough to dismiss these allegations. Rather, this inquiry suggests that evidence, fairness, and logic dictate another perspective must be equally considered: Top bridge managers may have surrounded themselves with only those who agree with them and marginalized those who do not.

Further, many of the dissidents interviewed for this report describe a disturbing, if unspoken, directive from management throughout their work on the project – do what you can to avoid creating documents that the public could access through the California Public Records Act (CPRA). For example, Mr. Merrill and Mr. Coe say Mr. Siegenthaler and Mr. Anziano repeatedly instructed them not to record concerns in writing, either on paper or email, but rather to communicate orally. While Mr. Coe initially declined to share his interpretation of that instruction, Mr. Merrill says Mr. Anziano did not want a record that would be legally available through the CPRA. Mr. Coe, when asked by Senator DeSaulnier in the January 24, 2014, hearing, agreed with Mr. Merrill's assessment.

Following is a discussion of a number of instances that suggest top bridge management attempted to bypass public records acts and silence critics.

### *NEW CONTRACTOR CONTROVERSY*

With MACTEC's quality assurance contract up for renewal, Caltrans re-advertised the contract in the fall of 2008. Caltrans then hired another company, Caltrop,<sup>38</sup>

<sup>38</sup> Link to Caltrop <http://www.caltrop.com>

which in turn subcontracted quality-assurance work to Alta Vista Solutions.<sup>39</sup> The Caltrop contract was worth \$40 million.<sup>40</sup>

An independent pre-audit of Caltrop/Alta Vista Solutions by Mayes Testing Engineers found the Caltrop/Alta Vista group was not adequately qualified for the job. Owner Michael Mayes says he wrote a report to Mr. Anziano but it “never got out of a draft stage. He kept asking me to change things. I had my suspicions. I think he didn’t want it to get out that these guys were not qualified.” It should be noted that the CPRA shields disclosure of draft documents and those not formally accepted.<sup>41</sup>

Eventually, Caltrop and Alta Vista Solutions recruited some MACTEC staff, which gave Alta Vista Solutions the qualified personnel needed for the job.

In 2011 Mr. Siegenthaler resigned from Caltrans and became a high-ranking executive with Alta Vista Solutions.

As noted, Merrill and MACTEC subsequently lost their long-standing quality-assurance contract for the Bay Bridge under controversial circumstances. Area Manager Peter Campbell of AMEC — which bought MACTEC — says it felt as if it was outright retribution.

Mr. Anziano says he does not recall any serious objections by Mayes Testing Engineers to the Caltrop/Alta Vista Solutions contract and, in any event, they eventually acquired the properly certified personnel.

In an initial interview, Mr. Anziano said that Caltrans dropped the MACTEC contract and hired the Caltrop/Alta Vista Solutions combination because there were “complaints” in the contractor community that the same people were getting the plum jobs over and over and that Caltrans was not allowing for competition.<sup>42</sup> Mr. Anziano added another perspective in the January 24, 2014, Senate hearing: “It did not move forward because a problem arose with respect to MACTEC in that they were refusing to allow Caltrans access to audit its records.”

<sup>39</sup> [Link to Alta Vista Solutions http://altavistasolutions.com](http://altavistasolutions.com)

<sup>40</sup> [Studies & Documents](#)

<sup>41</sup> [Mayes documents](#)

<sup>42</sup> There are legal and administrative remedies for contractors who believe this is an issue.

AMEC executives dispute this claim, saying an audit took place, which they regularly undertake with all their clients. But in this case, they assert, the company got a “termination of negotiation notification” regardless. “We were shocked,” Mr. Campbell said.

In the January 24, 2014, Senate hearing, Mr. Anziano refuted these charges by pointing out that he had sought to extend MACTEC’s contract with a “sole source” contract, and later Caltrans provided documents confirming that assertion.<sup>43</sup> In fairness those documents show the official interest in staying with MACTEC took place in March 2008, before the welds issue came to a head.

Alta Vista Solutions executives have contradicted much of the criticism directed their way. Company President Patrick Lowry and CEO Mazen Wahbeh refute Mayes Testing Engineers’ audit, saying it examined the qualifications of the prime contractor, Caltrop. Moreover, they say Caltrop initially hired the MACTEC employees and Alta Vista Solutions did not until at least a year later. However, Dr. Wahbeh and Mr. Lowry were MACTEC employees who formed Alta Vista Solutions, quit MACTEC, and immediately became subcontractors on the Caltrop contract.<sup>44</sup>

Mr. Lowry and Dr. Wahbeh dismiss Mr. Coe’s allegations of “lying” about critical weld inspections as a “misunderstanding” and an “emotional” outburst by Mr. Coe.

As for Mr. Coe, Mr. Anziano reassigned him to the Antioch Bridge project after determining he “had been unable to establish a working relationship with our contractors.” Mr. Anziano said it was good for Mr. Coe to get “a fresh assignment.”

“Anyone who went against Tony didn’t stick around,” Mr. Coe says. “This is the first time in my career the engineering wasn’t allowed to be done right. This is the first time engineering decisions were made by non-engineers.”

Mr. Anziano testified in the January 24, 2014, Senate hearing, “In the course of my tenure in my current position, I’ve reassigned one individual and that’s the individual that we’re talking about in this instance.”<sup>45</sup>

<sup>43</sup> **Studies & Documents**

<sup>44</sup> Lowry concedes the situation “looked weird” and that Caltrans “didn’t like it.”

<sup>45</sup> In June 2014, Mr. Anziano added that Mr. Coe had been “insubordinate” because he carried on an inspection Mr. Anziano had prohibited.

### *PRIME CONTRACTOR WELDING CONTROVERSY*

In 2006 American Bridge/Fluor (ABF), the prime contractor with a \$1.4 billion contract from the state of California to build the key SAS portion of the bridge, hired Nathan Lindell to be in charge of ensuring the quality of the fabrication by ZPMC in China. Mr. Lindell has unusually high-end credentials to perform this kind of work: He is on the American Welding Society's Main Committee, Bridge Welding Committee, and Railroad Welding Committee, and is Chairman of the Reinforcing Steel Committee. In short, it would be very difficult to find someone more qualified to ensure the contractor's work meets contract and code requirements.

Mr. Lindell arrived at the Shanghai factory and almost immediately found a shocking situation.

"I am very concerned we are headed down a dangerous path that without attention now will cause this project to spiral out of control with severe consequences," he wrote in an email to his boss, ABF China Project Manager Thomas Nilsson on January 19, 2007. The next day he added, "Someone better get a plan in place very soon or this project will not succeed."<sup>46</sup>

Mr. Lindell, who agreed to answer questions at the formal request of the state Senate, found virtually every aspect of the ZPMC fabrication process deeply flawed: "Oversized welds, undersized welds, welding over previously deposited slag, insufficient preheat temperature, exceeding the maximum interpass temperature, welding with unapproved procedures, insufficient repair weld quality, performing critical weld repairs without prior approval, welding outside approved weld zones and excessive travel speed," Mr. Lindell reported to his boss in a nine-page letter in May 2007.

Moreover, Mr. Lindell discovered the environmental conditions and application of coatings by ZPMC were "inadequate."

<sup>46</sup> Internal ABF documents, as with all internal contractor documents, are private and not subject to the California Public Records Act, even when the work is paid for with state funds. This inquiry has secured copies of some documents, however, and they can be found at the Studies & Documents page ([link](#)).

This was just the beginning of the problems that Mr. Lindell discovered and that eventually led to him experiencing the same consequences as the other construction critics in this report.

Mr. Lindell says he was shocked to learn, as he noted in a July 2007 letter to his boss, “ZPMC has no method of tracking welds as required by the Special Provisions.” In an email back to Mr. Lindell, Mr. Nilsson wrote, “I don’t disagree with your assessment.” Consequently, prior to locating to China, ABF and Mr. Lindell agreed to the development of a software database capable of tracking all welds and the required nondestructive examinations, repairs, and post-repair inspections. ABF paid for eight staffers to assist in the task of logging every one of the 918,359 welds. Mr. Lindell suggests that this would be enough paperwork to fill an entire cargo container.

Mr. Nilsson invited Mr. Lindell to have an “open dialogue.” Mr. Lindell, correspondingly, was frank: “I have never worked on a project that is this messed up so early in the process ... I don’t think anyone understands how hard this project is going to be. We should have about 20-30 engineers, project managers, document control and quality personnel onsite now.”

Mr. Lindell did get some help in February from Fabrication Manager David Williams, who wrote in an internal email to Mr. Lindell, “It doesn’t look like the Chinese had a clue when they bid this job as to what to expect. I asked Thomas (Nilsson) if the Chinese just threw a price at the job, not really looking at any logic, and he said yes, that’s the way they bid the fabrication.”

“Amigo, I think we have our work cut out for us!”

ABF Vice President Brian Petersen, in charge of the project, refused to answer questions posed by this inquiry, saying the company would respond only if compelled by subpoena.

However, an internal letter from then ABF Project Director Michael Flowers — who last year became president and CEO of the company — dated October 2007 tartly dismissed Mr. Lindell’s plea for help, stating, “In short, ABF denies your request for any significant changes in the parties’ agreement based on the allegations made in your letter.”

ABF finally conceded to provide some help, but only after the TBPOC agreed to spend an extra \$4 million through CCO 77. Some of this money was for beginning

a new tagging process for completed work in Shanghai, some for Mr. Lindell to continue creating the database tracking the welds. To date, Caltrans says it has spent \$13 million on the database. When asked to provide it to this inquiry, Mr. Anziano first responded that it is still in draft form. Several weeks later, Caltrans officials said the data belongs to ABF and the state cannot release it.<sup>47</sup>

Mr. Lindell says the data supplied by ZPMC for the database were filled with errors, incomplete, and “very, very inconsistent.” ZPMC’s response was always “we don’t want to do that,” Mr. Lindell says. “Not necessary. Too strict. They understood. They just didn’t want to do it. I was angry, I was shocked.”

When he told his bosses he questioned the integrity of the data, they placed people between him and ZPMC to “filter” his complaints.

Mr. Lindell says that when he spoke to his ABF manager about his growing concerns, he came away with the clear impression that “at a certain point I think ABF gave up and turned it over to Caltrans.”

In at least one key meeting with Mr. Anziano, one in which Mr. Coe walked out because he was so upset with Mr. Anziano’s decision, Mr. Lindell says Mr. Anziano instructed inspectors to not inspect between the crucial tack welds in rib joints.

When asked about the report by Caltrans Consultant John Fisher stating the cracks would not propagate, or run, Mr. Lindell says, “He’s crazy. I’ve seen cracks propagate in fabrication. I mean major.”

Regardless, Mr. Lindell says he soon found himself in trouble. Colleague David Williams told him top ABF bosses were considering firing Mr. Lindell. Instead, “for all intents and purposes my duties were relinquished to the software development role. I was no longer consulted or invited to meetings. I went from the management of the quality ... to just paperwork. Not even that.”

At the end of 2009, with his contract up for renewal, the company dismissed him.

<sup>47</sup> Caltrans officials say that only when the database is complete and the Department “accepts” it — Mr. Anziano says that should be this fall — then will it become property of the people of California. It must be noted the database contains information from only ABF-controlled quality control, not Caltrans quality assurance.

“I was very upset because I think the project that should have been built here was built overseas and they changed the rule book,” Mr. Lindell says. “I went there under the false pretense that it was to be built under the same rule book. And it wasn’t. As far as my reputation, I had to go back to my old employer with my hat in hand. I had to eat a lot of crow. It was emotionally difficult.”

### *FURTHER CONCEALMENT OF WELD CONCERNS*

As mentioned above, Keith Devonport says that in June 2009 he presented, in writing,<sup>48</sup> to Mr. Anziano his concerns about cracks not just in the deck, but also the tower. In November of that year Mr. Devonport told Alta Vista Solutions executives that in his professional opinion there was serious reason to use the detection method (Scanning Pattern D) not just for the decks but for the tower as well.

Alta Vista Solutions President Lowry responded by saying he has “a lot of respect for Keith Devonport,” adding there were “many times I made recommendations that the Department (Caltrans) didn’t go with.” He added, “I have no issues with the decisions that were made ... that may not have been the decision that I would have, that I was recommending to go with at the beginning, but eventually how they were resolved and everything, I’m fine with.”

In May 2010 Mr. Devonport’s company, under contract to Caltrans, told Mr. Devonport that because top bridge managers believed he “complained too much,” they were transferring him to Oakland, where he sat in an office with nothing to do for three months. Bored, he resigned.

Mr. Devonport concluded that the bridge managers were demonstrating “willful blindness.”

John Kinsey, one of the MACTEC employees who moved to Alta Vista Solutions when the contract changed, found himself not just on the outs but feeling “threatened” because of his concerns about the faulty welds.

Mr. Kinsey says his recommendation to managers that Scanning Pattern D was a necessary inspection method was “not well-received.” The standard response was it’s “not required by the code.” His read is that the inspections “would impact schedule. There was a race for time before the next earthquake.”

<sup>48</sup> *Studies & Documents*

“My personal opinion: Getting the bridge built was very important and I, at times, believed schedule was trumping quality,” Mr. Kinsey says. This did not go down well and soon Mr. Kinsey “felt threatened that I would be sent home.” Instead, Mr. Kinsey’s bosses, working for Caltrans, transferred the principal scientist to “logistics” — getting apartments for engineers, for example — “everything but technical aspects.” He said the move was a demotion that “tarnished” his professional reputation. Mr. Kinsey stayed until October 2011 when he took on another, better assignment with Caltrop, which, as noted earlier, has split with Alta Vista Solutions.

When asked to respond to Mr. Kinsey’s assertion that he told Alta Vista Solutions’ CEO that Scanning Pattern D was necessary to fully assess the indications of faults in the welds and that Alta Vista Solutions executives rebuffed him, Mr. Lowry dismissed him, using the same explanation he used for dismissing Mr. Coe: “He’s an emotional guy.”

David McClary confirmed the alarming number and percentage of transverse cracks in the OBG welds. He joined the chorus of concerns presented to both bridge management and the new quality-assurance contractor, Alta Vista Solutions. He says his work evaluations were positive, with no indication of trouble ahead. Nevertheless, Mr. McClary says Mr. Anziano forbade him from making the most controversial inspections. Mr. McClary says he had a growing feeling top bridge management did not look at him with favor.

In December 2009 his consulting company<sup>49</sup>, working for Caltrans, reassigned Mr. McClary to a computer job. His reaction: “I felt I was being benched.” Like Keith Devonport and John Kinsey, he soldiered on in his new job, despite it being out of his wheelhouse. He transferred out in the summer of 2011.

In the Bay Area, Mr. Forner, finding himself increasingly frozen out of any communication with Mr. Anziano and decreasingly involved in any meaningful work, came to see himself as a “placeholder.”

Documenting his concerns also proved challenging. Mr. Forner says Mr. Anziano would speak to him if he found out about a note sent directly to the TBPOC middle managers: “‘Did you send this to \_\_\_\_\_?’ he would ask. ‘You are supposed to send it to me first.’ But if sent to Tony, it would die. That was the whole dance with

<sup>49</sup> Lim & Nascimento Engineering (LAN), later acquired by AECOM

Tony.” If management agreed to an email, everyone “understood” it should have a blank subject line, making it far more difficult to retrieve it for a public document request.

In November 2008, Mr. Forner “opted out” of working on the project in China and returned to the Bay Area. He retired from Caltrans in 2012.

Mr. Purcell, also finding himself increasingly marginalized as he objected to what he considered essentially giveaways in the change order process he was supposed to authorize, says, “I couldn’t understand it.”

He says Mr. Anziano effectively took his job away and gave it to a far less experienced engineer. Mr. Purcell says Mr. Anziano then reassigned him to lesser responsibilities.

Rick Morrow was also finding his role greatly diminished as he, too, could find no engineering justification for an increasing number of troublesomely expensive CCOs. When asked if he documented in writing any of his issues at the time, Morrow’s answer had a familiar refrain: “We had very strict orders from Tony to never put anything in email. We don’t say things in emails that could be recovered [through] public records act [requests].”

At a “routine” meeting in the spring of 2010, Mr. Anziano announced Mr. Morrow’s reassignment. “I was just stunned. I asked him to repeat. The room was quiet. It was a big deal. It was to me.” Mr. Morrow says he tried to talk to Mr. Anziano about it but found him “hard to read.” Later, Mr. Morrow added that Mr. Anziano “talked a lot of baloney.”

Mr. Morrow says he “hung on” for six months “but it became apparent there was nothing else to do.” In 2011 he requested a transfer to another bridge project — the Gerald Desmond Bridge in Long Beach — and has been working there as the engineering services’ independent quality-assurance manager since.

### *ANCHOR RODS PROBLEMS*

Problems were not isolated to the crucial welds holding the new Bay Bridge together. Indeed, the now well-reported controversy regarding the hydrogen-embrittled bolts demonstrates a pattern of problems with quality-assurance oversight as well as efforts by management to conceal the truth from the public.

As has been thoroughly researched and discussed in newspaper articles since, in March of 2013 over thirty high-strength steel rods cracked under tension on the bridge due to a well-known inflection known as hydrogen-embrittlement. Basically, these giant bolts, three inches in diameter and between nine and twenty-four feet long, broke because they were manufactured in an inappropriate way for their expected use.

According to Mr. Merrill, Caltrans sent his MACTEC quality assurance team to the Midwest to assess the bolts at the fabrication site. In September 2008, the team found the anchor rods were not elongated properly and the nuts not adequately hardened. The quality assurance team went back for a second inspection after fabrication began in October and found more of the same problems.

The quality assurance documents submitted to Caltrans by MACTEC also state the prime contractor, ABF, got the rods “too late to allow normal release procedures.” This documentation suggests that because the anchor rods were delayed, the typical quality-assurance processes and tests were not completed. Without those QA tests, Caltrans was unaware of the inadequacy of the rods which broke.

Mr. Merrill stated that a subsequent inspection found anchor rods and “the E2 Shear Key was shipped to the job site without quality assurance testing results or METS release. Time was constrained because these components were ordered on a schedule that led to completion of fabrication only several days before anticipated installation.”

The contractor blamed Caltrans for “schedule difficulties.” Caltrans disputes that assertion. Bridge managers resolved the situation by accepting the anchor rods “as is.” This means that the proper amount of quality testing was not completed.

Mr. Merrill suggested there be more testing of the bolts if the fabrication was to go ahead. “I got told we weren’t doing any testing and to stop mentioning it,” Mr. Merrill states. “I was basically told to stop bringing it up. That was the end of that.”

In January 24, 2013, testimony before the state Senate, Mr. Merrill was asked with whom he had these conversations and he named Mr. Anziano. Later, in the same hearing, Mr. Anziano refuted that assertion.

## *TOP MANAGEMENT RESPONSE*

Mr. Anziano says he does not recall instructions to not put objections in documentable form. “In my view you are always better off with written communication,” Mr. Anziano says. He does recall instructing Mr. Coe to withdraw a critical letter after some spirited discussions about weld quality. “Mr. Coe wanted tests that were beyond requirements and beyond contract. As a group we made this decision [to not perform the additional tests]. That’s not to say there wasn’t dissent.”

Mr. Anziano also stated that “no one was discouraged in reporting quality assurance,” and that there were only “healthy conversations” and “philosophical disagreements” regarding the weld issues. In addition, Mr. Anziano stated in the January 24, 2014, Senate hearing, “In my view and what I expressed to that group, is that you’re always better off with the most documentation you can possibly get, but please make sure that it is accurate. ... There probably have been some instances in which I have expressed some concerns with respect to the way things are worded because they are inaccurate.”

Mr. Anziano also stated at the hearing that “We’ve seen instances time and time again where we have, in effect, gone to war with a contractor, and that’s never a good thing on a construction contract. It will cost you time, it will cost more money, and it will not resolve the problems that you are arguing about ultimately.”

In a subsequent interview, Mr. Anziano’s perspective on the personnel issues differs substantially from those of his critics.

Mr. Anziano says he does not see the pattern of problems charged by some of his top people responsible for welding inspections and CCOs. He says he invited dissenters to “go up the chain” to the TBPOC itself if they felt his decisions were wrong, but none did. “On any project, big or small, a group of people are not going to be happy.” Mr. Anziano also pointed out “my job is not to be popular ... it’s to do what’s best for the project.”

Mr. Anziano’s response to charges by Mr. Merrill and Mr. Coe are noted above. Specific to the other dissenters mentioned in this report, Mr. Anziano disputed each account:

- Regarding Mr. Devonport, he says he has no memory of the British engineer calling for the use of Scanning Pattern D on the welds.<sup>50</sup> Mr. Anziano says Mr. Devonport angered prime contractor ABF. “Fabrication Manager was [a title] he made up.”<sup>51</sup> As for Mr. Devonport’s reassignment, Mr. Anziano says he was given an important job working with the critical but stalled shop drawings for the SAS cables. As far as the visit to TWI in Cambridge, England, Mr. Anziano dismissed it, saying, “It turned out to be more of a sales pitch for one of their products.”
- Regarding Mr. Kinsey, Mr. Anziano says the bridge design firm, T.Y. Lin, did not want to follow Mr. Kinsey’s recommendation to use Scanning Pattern D. “It was not my determination. Absolutely not.” He also noted Mr. Kinsey was a consultant and that his company removed him because he had been “abusive” to a fellow worker. Mr. Anziano acknowledges calling the company to complain about the alleged incident.
- Regarding Mr. McClary, Mr. Anziano disputes the assertion that he forbade any inspections. As for the move from inspections to a desk job, Mr. Anziano says, “As I recall, Dave volunteered” for the reassignment.
- Regarding Mr. Forner, Mr. Anziano says he “disputes” the allegations of shutting down his dissent. As for Mr. Forner’s departure, Mr. Anziano says he wanted the principal engineer to stay.
- Regarding Mr. Purcell, Mr. Anziano says “I don’t recall Gary disputing any of these things,” in reference to the change orders Mr. Purcell says were inappropriate, adding Mr. Purcell’s remarks are “a bit of exaggeration.” Mr. Anziano added, “Gary never caused trouble. I wanted to hang on to Gary, but the role of the resident engineer changed in the world of the oversight committee. The R.E. in his world was the king. Now he had to answer to others.”
- Regarding Mr. Morrow, Mr. Anziano says his objections are “not ringing a bell.” He later added that, as with Mr. Purcell, “clearly he had a hard time with it. It was painful for me. But in my judgment we needed to refocus as we were going into the stretch.”

<sup>50</sup> **Studies & Documents**

<sup>51</sup> Mr. Devonport says Mr. Anziano and Mr. Siegenthaler expressly assigned him the title.

In the end, Mr. Anziano says the lesson learned is “blurt it all out” as it happens — in other words, have far more transparency as big projects lumber forward.

The principal transportation engineer for the project and de facto right-hand man to Mr. Anziano is Kenneth Terpstra. Recently, Mr. Dougherty instructed Mr. Terpstra to undertake a \$360,000 “lessons learned” study of the Bay Bridge. Mr. Terpstra says his No. 1 conclusion is a need for more transparency. A week before the scheduled issuance of his report at the end of May 2014, Mr. Terpstra said he had not interviewed any of the eight bridge principals discussed in this report. Caltrans executives subsequently delayed the release of the work.

Mr. Terpstra, a witness to the controversy between Mr. Coe and Dr. Wahbeh regarding the inspections of welds on OBGs bound for Oakland, says it was a “misunderstanding” and a “breakdown in communication.”

“I could not get certain aspects of this team to gel,” he says ruefully. “Tony and I came in 2006 and did not pick our team.” Regarding the dissenters that left by one means or another, Mr. Terpstra said, “I could tell you 800 other names that would tell another story.” Mr. Terpstra says the issue is not about Mr. Anziano, but about “Caltrans culture at a construction site. It’s about the [TB]POC approving all CCOs of \$1 million or more. It’s about living in perpetual jetlag. It’s not a pattern. It’s just individuals. The pressure was immense. Tony had to make difficult decisions. For you. For the senator. For the people of California.” He added, “I think we should have spent more time to get the buy-in.”

Mr. Heminger, arguably the most responsible top manager for the Bay Bridge project from the beginning to end, says the “very best” people working for and with Caltrans came to the Bay Bridge project. That some of them have had serious professional issues with how to go about ensuring quality and cost does not concern him. “I don’t think you can put these ... together in one unbroken chain.” He dismissed much of the criticism as “professional jealousy” by “disgruntled” workers.

“They were dissenters and did not reflect the consensus,” Mr. Heminger says. He also expressed support for Mr. Anziano.<sup>52</sup>

<sup>52</sup> Mr. Heminger acknowledges that Mr. Anziano almost lost his job in 2009 because he was “compartmentalizing information.” Mr. Heminger added that Mr. Anziano “was not as transparent with us as we wanted him to be. Attorneys will tell you what you need to know. Not much else.”

Mr. Heminger says MACTEC lost its contract fair and square. “If his [James Merrill] firm was still [on the job in China] ... we would still be in a dead stop over there,” Heminger says.

Regarding the calls for welding inspection method Scanning Pattern D, Mr. Heminger says it was not in the contract.<sup>53</sup> “They [dissenters] were disappointed that they didn’t find indications, so they asked for finer and finer testing. They made it their mission to find problems.”

<sup>53</sup> Dissenters counter that the contract called for code standards and the code called for using Scanning Pattern D to ensure quality welds.

### Chapter 3: FIDUCIARY RESPONSIBILITY

Bay Area drivers have had an expensive time of it since the 1989 Loma Prieta earthquake. During the years following the quake, the public generally understood and accepted the increase of the \$1 toll to \$2 in 1998 and to \$3 in 2004. But then, as bridge retrofits — led by the new eastern span of the Bay Bridge — increased in cost, the tolls jumped in 7 years to \$6 during primetime driving hours.<sup>54</sup> For an average commuter who must travel the bridge during the regular commute five days a week, that's \$30 a week, \$120 a month, and roughly \$1,500 a year.

This toll money goes not just to the Bay Bridge, but also to making all the state-owned bridges in the Bay Area seismically safe. In addition, the funds pay for many other much-needed and -desired public works projects, such as the fourth bore of the Caldecott Tunnel, connecting Alameda and Contra Costa counties. Caltrans contractors have completed many, if not all, of these projects on time and on budget, especially the ones started after the creation of the TBPOC.

As for the eastern span of the Bay Bridge, as it has been noted time and again, the original estimate of \$1.4 billion for a new bridge has soared a “staggering”<sup>55</sup> 400 percent to almost \$6.4 billion.

Although most of the Bay Bridge cost increases took place before the Legislature created the TBPOC nine years ago, the project's cost has surged again by almost \$1 billion dollars since that time.

#### *COST INCREASES UNDER THE TBPOC*

In 2005, the Legislature passed AB 144 (Hancock) with a total budget of \$8.685 billion to address the entire seismic retrofit program of all Bay Area bridges. Of that total, the Legislature earmarked \$5.486 billion for the eastern span replacement project. With the explicit concern in mind that the new management might have to find more money, the bill included \$900 million of contingency funding.<sup>56</sup> The three-member TBPOC later added another \$89 million to that sum.

<sup>54</sup> The rush hour toll of \$6 — as opposed to \$5 for non-peak traffic times — is called “congestion pricing,” designed to dissuade motorists from driving in those time periods.

<sup>55</sup> Karen Trapenberg Frick/UC Transportation Center unpublished dissertation <http://www.uctc.net/research/diss130.pdf>

<sup>56</sup> The \$900 million was the sum announced by MTC Executive Director and TBPOC Chairman Steve Heminger at the 2005 kickoff dinner attended by the prime contractor, ABF, which caused some Caltrans managers to “cringe.”

The TBPOC started spending the roughly \$1 billion contingency funds in July 2007.

As of this writing, the TBPOC has spent all but \$85 million of the Bay Bridge money.<sup>57</sup> Among the more notable changes made after the TBPOC took charge of the project was the single most expensive change order, CCO 160, which cost an extra \$185 million.<sup>58</sup> This change order related to delays in shipping fabricated steel from China for the SAS decks and tower.

Some of the drama revolving around approval of CCOs can be glimpsed in the TBPOC minutes. For example, on May 19, 2009, the TBPOC approved CCO 108 to “accelerate” construction for a cost of \$45 million. On July 7, 2009, then Caltrans Director and TBPOC Chair Will Kempton in his last meeting said ABF and T.Y. Lin/Moffatt & Nichol (the designers) “have an unhappy client,” referring to the TBPOC. Heminger said later the TBPOC worried that ABF was not giving its full attention to the Bay Bridge, but was distracted by other contracts with other parties.

A compilation of the change orders for the 15 prime contractors under the TBPOC management amounts to an extra \$1.4 billion. This is not to say none of these changes were worthy; this is not an audit of CCOs. Yet the public has a right to scrutinize how its stewards spend its money, including on change orders.

Having stated that, it is also important to cite Mr. Heminger, who notes conditions do change, sometimes beyond human control. “There’s a common expectation in the public that when something gets built it will be perfect,” he says. “It’s not.”

The TBPOC also approved some changes one authority has called “prettying up the bridge,”<sup>59</sup> such as the 37 Canary Island palm trees planted along the Oakland end of the span at a cost of \$34,000.<sup>60</sup> Many of the trees will be lit up at night. Another example of aesthetic-driven costs is the \$4.8 million spent on custom LED

<sup>57</sup> Steve Heminger says the POC took \$130 million out of the fund and is saving it in another line item.

<sup>58</sup> [Studies & Documents](#)

<sup>59</sup> Denis Mulligan, once state toll bridge program manager and now general manager and CEO of the Golden Gate Bridge.

<sup>60</sup> Each tree cost \$9,149.

lights that were not in the original plan. Mr. Heminger acknowledges the TBPOC approved a “pretty aggressive lighting budget.”<sup>61</sup>

As of the 2014-15 budget year, MTC has \$855 million in a bridge “rehabilitation” budget — much of it to be used to continue retrofitting the Bay Bridge.<sup>62</sup> In addition, MTC expects to separately spend \$12 million to \$15 million a year for bridge maintenance.

<sup>61</sup> The original lighting budget was for \$16.1 million and after all the changes ended up being \$20.9 million.

<sup>62</sup> As of this writing, the 2014-15 budget calls for \$976 million, about 25 percent going to the Bay Bridge. That is expected to increase to almost a third of the budget in the next decade.

## Chapter 4: TWO DOZEN YEARS OF PLANNING AND BUILDING

No one suggests managing an ambitious, multi-billion dollar public works project such as the eastern span of the Bay Bridge will be a model of streamlined efficiency. However, even the most defensive managers will, in moments of candor, agree that there are management lessons to be learned from the project.

There have been eight Caltrans directors since the Loma Prieta earthquake, and some suggest the resultant lack of continuity has been an issue in the development and management of the project.<sup>63</sup> While leadership comes and goes, policies, protocols, and procedures can be enacted to keep a project on track, regardless of who is in charge. It is unclear if such protocols were applied to this project.

In 1996, Caltrans engineers said the original design with a tower and suspension cables — this after years of haggling about issues like what earthquake standards to use, whether to retrofit the old cantilever bridge, whether to put rail across it and more — would take eight years and cost a little less than \$1.4 billion. The two Caltrans engineers who have taken most responsibility for this oft-cited estimate even today say they could have accomplished that — with one major qualification: If they were left alone to build the bridge they designed, scheduled, and based their cost estimates on.

“I never anticipated all the political turmoil,” says the affable Caltrans estimator Chris Traina. “We’re taxpayers, too,” he adds with a hint of plaintiveness.

But Mr. Traina and Brian Maroney — now the toll bridge program chief engineer — are among the minority here. Most everyone else inside Caltrans, the MTC, and the California Transportation Commission who was interviewed for this inquiry is in accord that the original estimate, based on a 30 percent design, was, in retrospect, unrealistic. To both men’s credit, that 30 percent design estimate was a model of progress at the time. Until then, estimates for other major projects normally began with 10 percent or less of the design completed.

Caltrans has learned from this experience, and now employs an increasingly sophisticated set of tools to conduct what planners call a “risk assessment.”<sup>64</sup> To

<sup>63</sup> Robert Best, James van Loeben Sels, Jose Medina, Jeff Morales, Will Kempton, Randy Iwasaki, Cindy McKim, Malcolm Dougherty.

<sup>64</sup> For example, the use of the Monte Carlo Method for estimating cost ranges is one of many tools that have emerged.

be sure, there are some events — such as the mayor of a large city and a branch of the military digging in their well-heeled shoes and heavy anchors for years at a time — that no one could reasonably have predicted when making the original cost estimates for this project.<sup>65</sup>

In retrospect, many transportation experts also agree that providing a hard cost estimate and completion date was a political error, although this is what the Legislature expected at the time. Instead, the vast majority of those interviewed for this inquiry suggest designers of future megaprojects should deliver a range of best- and worst-case scenarios.

### *PREVIOUS EXAMINATIONS AND CHANGE*

There are countless studies, audits, and reports on the Bay Bridge, but no one at any agency — not Caltrans, not MTC, not the California Transportation Commission — has a clear and comprehensive catalogue of this vast and expensive set of documents. Even the Caltrans library staff in the Sacramento headquarters doesn't know how to curate this valuable treasure trove of data, insights, and lessons. There is no tracking of how much money was spent on these studies. This situation is symbolic of the lack of simple organizational tools that can have an incalculable effect on quality, transparency, costs, and delays of major projects.<sup>66</sup>

Academics, such as Karen Trapenberg Frick of the University of California Transportation Center in Berkeley, say that what have become standard management planning tools at many large organizations are not present at Caltrans. For example, Frick notes Caltrans engineers have extraordinarily limited travel budgets to attend workshops and conferences where technological and other advances are routinely shared among transportation professionals. This contributes to the difficulty of negotiating with better financed and trained contractors. Caltrans executives — such as recently retired Mr. Land, who oversaw Caltrans'

<sup>65</sup> One of the more startling stories revealed in the course of this investigation is that of the Navy's well-known refusal to allow Caltrans to dig a small series of four-inch holes on Yerba Buena for soils tests. What is not well-known is the "Naval blockade" led it to send boats into the bay waters where Caltrans engineers were taking samples well away from the island where the SAS foundations were to go. The Navy threatened to board the Caltrans boats and arrest the crew if it did not cease, desist, and depart — which Caltrans did, further delaying the project.

<sup>66</sup> We have attempted to correct this by accumulating as much material as possible and posting links and other access points here: [Studies & Documents page](#). In addition, all hard-copy research materials are deposited at the MTC library.

travel and study budget — take some issue with this perspective, but allow that state budget cuts have sliced deeply into this aspect of Caltrans' operations.<sup>67</sup>

Almost everyone involved in the Bay Bridge project attributes some of the costly delays to a culture at Caltrans that takes too much time to execute the simplest of tasks. Just about everyone has a story, and former Caltrans Director Will Kempton's is among the best: When he was the boss he wanted to place a small, inexpensive directional decal on freeway entrance signs so drivers would know if they needed to be on the right or left side of the street in order to get to a freeway onramp – a small but important advance. Unfortunately, even the director of Caltrans couldn't get this done.

History suggests that delay on big projects may not always be avoidable; it may, at times, even be necessary. Applying modern management practices, however, may save much time as well as cost. These practices include public disclosure and encouraging employees to be candid. If, for example, bridge managers had fully addressed the anchor rods issues found in 2008, the extra time and millions spent to resolve the problems may have been avoided.

### *UNEXPECTED DELAYS*

Relations with and between various public agencies involved in developing the Bay Bridge project are responsible for some of the delays to the project. For example, the city and county of San Francisco and the U.S. Navy created large delays for the project.

Former Mayor Willie Brown knew San Francisco would be assuming full ownership of the naval base at Treasure Island and adjoining Yerba Buena Island (YBI). He had been making plans for developing the land that are best told in an account found in the unpublished Ph.D. dissertation by Ms. Trapenberg Frick, assistant director of the University of California Transportation Center in Berkeley. We quote extensively from it here:

<sup>67</sup> For an in-depth examination on this issue, see “Risk Assessment and Risk Management for Transportation Research,” authored by UC Berkeley transportation scholars Elizabeth Deakin, Karen Trapenberg Frick, and Kathleen Phu: <http://uctc.net/research/papers/UCTC-FR-2014-01.pdf>

The “marina development at Clipper Cove was accelerated when San Francisco approved a \$12 million marina expansion plan by Treasure Island Enterprises, a joint venture of lobbyist and businessman Darius Anderson and Ron Burkle’s Yucaipa Company. The proposal recommended construction of a 400-slip marina, restaurant, a public pier and other related amenities.

Another critical capital project for the naval base was upgrading the access ramps between the Bay Bridge and YBI. The Navy and San Francisco thought the ramps were substandard and unsafe. These ramps were of interest because the only vehicle access to the islands was via these ramps, and safe vehicle access was tantamount to ensuring successful development. The Navy owned the ramps and was in the process of transferring ownership to either San Francisco or Caltrans. The agencies debated who should pay for upgraded ramps, and they strongly recommended that the East Span project upgrade and fund improvements. Since a major financial package was being put together for the bridge, it seemed rational to San Francisco and the Navy that the facility’s access ramps ought to be included. A preliminary draft cost estimate for ramp improvements was reported at \$25 million in 1997. San Francisco and the Navy approached Caltrans about funding the ramps. In response, Caltrans replied, “Replacement of the ramps is not related to the purpose and need of the East Span Seismic project. Furthermore, the ramps are outside our jurisdiction since they are owned by the Navy. To include replacement of the ramps in the East Span Seismic Safety environmental document would be to expand the scope beyond the intent of seismic safety.”

One Navy source told Frick “we never felt we could give property away. In the case of Treasure Island, it’s a valuable property.”

“Importantly, however, an interview with a naval official revealed that the Navy’s support also was tied to its interest in maintaining a relationship with Mayor Willie Brown to assist the Navy with the disposal and reuse of Hunter’s Point Naval Shipyard, a base in southeastern San Francisco that had been closed as a full service base since 1974. According to this official, the Navy “definitely had instructions to support, in law, the city, but we really needed him (Mayor Willie Brown) on Hunter’s Point. Navy wanted Brown to tell his folks to get moving and take the property over. We wanted him to take it off our hands quickly.” This official commented that Hunter’s Point was a particularly controversial base for the Navy to dispose of

because of major issues related to environmental clean-up as well as addressing issues raised by the strong neighboring area of Bayview/Hunter's Point that had been largely affected by the base's original closure. This interview revealed that the Navy had a broader agenda than had been reported in other interviews and in the media about the reasons for supporting San Francisco.

Engineers, academics, news editorials, and public officials have assigned blame widely both before and after the creation of the TBPOC: blaming Oakland and San Francisco city halls, the Sierra Club, bike coalitions, and others. Clearly the California state Legislature and the highest reaches of the executive branch had a role in politicizing the bridge. All were acting in what they saw as their interests and undoubtedly what they regarded as the interests of their various constituencies. As demonstrated with this project, resolving the inherent conflicts among these interests ahead of an undertaking as grand as the Bay Bridge project can save time and money for any future projects.

## CONCLUSIONS AND RECOMMENDATIONS

Again, it is critical to state that no one involved in this report believes or asserts that the new Bay Bridge is unsafe. Concerns highlighted in this report relate to the lifetime maintenance of the span, as well as the flaws in the management and development of the project overall. Following is a list of conclusions and, when possible, recommendations flowing from the findings of this inquiry.

- Transparency in the affairs of the public is paramount and leads to accountability, which leads to better results.
- No public agency should be exempt from basic open government laws such as the Ralph M. Brown Act and the Bagley-Keene Open Meeting Act.
- The state Legislature and the top tiers of the state executive branch should swiftly investigate the alleged pattern of quashing dissent. It is particularly important to get to the bottom of repeated charges of retribution against staff employees and contractors for fulfilling their professional responsibilities to the people of California.
- All public agencies and their officials should formally require communications take place in some permanent, retrievable media such as writing. This protects everyone. Naturally, correspondence regarding negotiations, personnel, or litigation should remain appropriately protected.
- Partisans of major projects such as the Bay Bridge — whether they are engineers, lawyers, or academics — should not be in charge of hiring public information officers for enterprises that are bound to be of great public interest and likely controversial. Rather, an independent panel of experts with a grasp of what news media, office holders, and especially the paying public want to know should make these key decisions.
- Given the controversy regarding the quality of welds, especially on the deck panels and portions of the OBGs, it would be prudent to ensure that a truly independent party — accompanied by credible critics — perform a definitive testing of the welds.
- A deeper look into the 100 NCRs on the tower and its welds should be conducted.

- Repeated allegations that engineering decisions were made by non-engineers should be investigated.<sup>68</sup>
- In California today there should be mandatory websites that do not simply promote government projects such as the Bay Bridge but have room for disclosure, discourse, critiques, inquiries, and more.<sup>69</sup>
- The Legislature should consider establishing a fully independent bureau of inquiry modeled on inspector general offices, whether for Caltrans or other state departments.
- Public agencies should routinely collect, consolidate, and curate studies, reports, and audits by subject, and make them readily available to the public online. This would include best practices, as suggested by UC Berkeley's Karen Trapenberg Frick at the January 24, 2014, state Senate hearing.<sup>70</sup>
- The Legislature should consider a policy allowing estimates for future large projects to include best and worst case scenarios, accompanied with risk assessments for each.
- The Legislature should consider creating a formal change manager role on large projects. The position would be responsible for tracking all change orders, non-conformance reports, and the like. These, too, should be readily accessible online to the public.
- The Legislature should consider creating oversight committees for large projects that might be modeled after the strong points of the TBPOC. As

<sup>68</sup> At the January 24, 2014, state Senate hearing, Senator Cathleen Galgiani asked: "For those who are above you who had the power and authority to reassign you somewhere else to say that the test was going to be done this way or allow that to happen, do they have licenses that are at risk as your licenses would be at risk? ... So someone without a license, with no license at risk, can trump someone who has a license at risk?" Both Mr. Merrill and Mr. Devonport are engineers who have made this allegation on the record and have evidence that should be considered for this critical controversy.

<sup>69</sup> Construction critics such as Profs. Astaneh, Devine, and Ibbs and outside experts such as Yun Chung should also be afforded an easily accessible place in this theater.

<sup>70</sup> At this time there is at least one book under production and one documentary film recently completed about the Bay Bridge. These sorts of examinations should be accessible to the public.

TBPOC Chairman and MTC Executive Director Steve Heminger states, it would be wise to have these oversight committees in place before projects begin, not afterwards when they are chartered to fix errors that are sometimes irreparable.

- The Legislature should consider conferring oversight powers to the California Transportation Commission, which last year alone doled out \$5.1 billion, but has no real role in making sure the money is spent the way the commission stipulates.
- Caltrans should publish executed contracts between state agencies such as Caltrans and its many contractors. Aside from the fact that this involves the public's money, visible contracts will create competition, not concealment.

## APPENDIX 1 — TIMELINE

October 1989: Loma Prieta earthquake.

November 1989: Gov. George Deukmejian orders board of inquiry about bridge and freeway collapse.

May 1990: Competing Against Time report (Governor's Board of Inquiry) recommends higher priority on seismic retrofitting.<sup>71</sup>

June 1990: Governor forms Seismic Advisory Board.

September 1992: UC Berkeley team commissioned by Caltrans says retrofit of the eastern span will cost \$150 million-\$200 million. New bridge would cost more than \$1 billion. Study costs \$500,000.

Summer 1995: Caltrans Seismic Advisory Board recommends consideration of new bridge.<sup>72</sup> Caltrans begins work on “30 percent design” study for estimates on final costs and schedule.

March 1996: Voters approve Proposition 192<sup>73</sup> authorizing \$650 million for seismic retrofit for state-owned bay bridges.<sup>74</sup>

August 1996: U.S. Navy begins to balk at Caltrans requests for use of the Yerba Buena land, where core samples are needed for future construction planning.

December 1996: Ventry Engineering report recommends a new, cable-stayed bridge. Estimated total cost is \$842,788,000 with completion by October 2002.<sup>75</sup>

<sup>71</sup> [Link to “Competing Against Time”](http://www.dot.ca.gov/hq/esc/earthquake_engineering/seismic_advisory_board/compete_against_time.pdf)  
[http://www.dot.ca.gov/hq/esc/earthquake\\_engineering/seismic\\_advisory\\_board/compete\\_against\\_time.pdf](http://www.dot.ca.gov/hq/esc/earthquake_engineering/seismic_advisory_board/compete_against_time.pdf)

<sup>72</sup> [Caltrans site link http://www.dot.ca.gov/dist4/eastspans/right.html](http://www.dot.ca.gov/dist4/eastspans/right.html)

<sup>73</sup> [Link to Prop 192 of 1996](http://www.calvoter.org/voter/elections/archive/96pri/props/192.html)  
<http://www.calvoter.org/voter/elections/archive/96pri/props/192.html>

<sup>74</sup> The state-owned bridges crossing various points of the bay estuary and rivers are Dumbarton, San Mateo, San Francisco-Oakland Bay Bridge, Richmond, Benicia and Antioch. The Golden Gate Bridge is owned and operated separately by the Golden Gate Highway and Transportation District.

<sup>75</sup> San Francisco-Oakland Bay Bridge East Bay Crossing Replacement Value Analysis Findings, Ventry Engineering.

December 1996: Caltrans Peer Review Panel also recommends new bridge.

December 1996: Caltrans project manager and principal bridge engineer for the eastern span Brian Maroney says 90 percent probability new bridge would be done by mid-2004.

January 1997: Caltrans decides on new bridge rather than a retrofit of existing eastern span. Navy and Caltrans dispute which is responsible for new ramps connecting bridge to Yerba Buena Island.

February 1997: Governor Wilson says it will be a new bridge, not a retrofit of the existing eastern span. State says it will pay for a simple skyway (no tower) for \$1.52 billion and have it open in 7 years (2004). Caltrans says two-towered cable-stayed bridge would cost \$1.7 billion.

February 1997: Legislature argues about Bay Area money obligation. Senate Pro-tem Bill Lockyer threatens litigation. Governor Wilson withdraws \$500 million pay offer.

February 1997: Lockyer asks the MTC to take charge of bridge design.

March 1997: The MTC appoints Bay Bridge Design Task Force.<sup>76</sup>

April 1997: Environmental review begins.

May 1997: Caltrans says adding a bike lane would cost \$167 million.<sup>77</sup>

May 1997: MTC's Design Task Force recommends a two-year study of the cable-stayed bridge option vs. the SAS. Controversy erupts over allegations that members of engineering panel allegedly participate in design "competition."<sup>78</sup>

June 1997: San Francisco Mayor Willie Brown opposes proposed northern alignment, saying it uses too much flat developable land in Yerba Buena. He also wants better ramps and a new Transbay Terminal.

<sup>79</sup> The MTC created a Bay Bridge Design Task Force, a seven-member subset of the commission. The MTC also created the Engineering and Design Advisory Panel (EDAP), comprised of 35 experts in bridge engineering, architecture, and geology. The Design Task Force made its recommendations based on the advice of the advisory panel.

<sup>77</sup> That study alone cost \$2 million.

<sup>78</sup> This charge was leveled by Coman Feher Associates.

June 1997: Coast Guard, with a base on the southeast corner of Yerba Buena, favors a northern alignment that would instead go on Navy land.

July 1997: Mayor Willie Brown changes his mind and supports northern alignment, saying he defers to the Port of Oakland, which also officially opposes southern alignment, saying it would interfere with its development plans. Mayor Brown continues his call for new ramps and Transbay Terminal.

July 1997: MTC Design Task Force says it needs another year for final report.<sup>79</sup>

August 1997: SB 60 & SB 226 (Kopp) call for statewide earthquake retrofits, including Bay Bridge for a cost of \$1.285 billion, estimated by Caltrans. This is to be paid by Regional Measure 1<sup>80</sup> toll funds. Total statewide was to be \$2.62 billion. The legislation imposed a \$1 toll on all bay bridges until January 2008 or until \$907 million was collected, whichever came first. After that, the toll could stay for “amenities imposed by the Metropolitan Transportation Commission.”<sup>81</sup> The legislation makes the MTC responsible for selecting design of replacement span. If costs go over, Caltrans required reporting to Legislature within 60 days and having a plan to pay for it.

September 1997: San Francisco Mayor Willie Brown writes letter to Caltrans saying if Navy gives islands to city, city will provide easements to Caltrans for bridge.

October 1997: A group of East Bay officials oppose spending the planned \$80 million for new Transbay Terminal in San Francisco.

January 1998: Tolls go up to \$2.

May 1998: Caltrans says 30 percent design complete. Cost of SAS would be up from \$1.28 billion to between \$1.50 billion and \$1.56 billion. A cable-stayed bridge would be somewhat less.

<sup>79</sup> The Design Task Force included now state Senator Mark DeSaulnier.

<sup>80</sup> [Link to 1988 measure http://bata.mtc.ca.gov/projects/rm1.htm](http://bata.mtc.ca.gov/projects/rm1.htm)

<sup>81</sup> [Links to SB 60 & 226 http://leginfo.ca.gov/pub/95-96/bill/sen/sb\\_0051-0100/sb\\_60\\_cfa\\_950320\\_094918\\_sen\\_comm.html](http://leginfo.ca.gov/pub/95-96/bill/sen/sb_0051-0100/sb_60_cfa_950320_094918_sen_comm.html) and [ftp://www.leginfo.ca.gov/pub/97-98/bill/sen/sb\\_0201-0250/sb\\_226\\_bill\\_19970812\\_enrolled.html](ftp://www.leginfo.ca.gov/pub/97-98/bill/sen/sb_0201-0250/sb_226_bill_19970812_enrolled.html)

May 1998: West span retrofit begins.<sup>82</sup>

June 1998: Richard Berkson of Economic & Planning Systems of Berkeley completes Treasure Island study for San Francisco Mayor Willie Brown's administration, concluding plan will cost city \$1.2 million. Brown withdraws support of northern alignment, saying it interferes with city's responsibilities and plans for island.

June 1998: Governor Wilson signs bill adding bike path to be paid for with tolls.

June 1998: The 34-member panel of the Engineering and Design Advisory Panel votes 12-7 (many were absent) for the SAS design over the cable-stayed bridge proposal. Subsequently, the Design Task Force votes for the same, with only one dissenting voice: then Oakland Mayor Elihu Harris.

July 1998: The Bay Area Toll Authority (same as MTC) board votes for the SAS design. Opponents include Anne Marie Conroy, representing San Francisco as executive director of the Treasure Island Development Authority (appointed by Mayor Willie Brown), and Oakland Mayor Elihu Harris.<sup>83</sup>

July 1998: Navy denies access to Caltrans for 4-inch holes soils testing until an environmental impact statement is complete.

December 1998: A group of East Bay mayors call for halt in order to study running a railway on new bridge.

February 1999: Mayors Willie Brown of San Francisco and Jerry Brown of Oakland write letters urging southern alignment and international competition for design, which would effectively start the already decade-old process over again. MTC officials state every year of delay could cost an additional \$50 million.<sup>84</sup>

February 1999: The MTC Design Task Force reconvenes to hear complaints about alignment and design.

<sup>82</sup> This study concentrates on the construction of the new eastern span. However, the retrofit of the historic western span took \$302 million and 6 years.

<sup>83</sup> Current state Senator Mark DeSaulnier voted for the SAS on both the Design Task Force and as a BATA member.

<sup>84</sup> The now infamous condemnation of a skyway design as a "freeway on stilts" is forever associated with these objections.

August 1999: White House meeting to resolve issues between Navy and Caltrans.

September 1999: Navy relents on drilling, ending more than a year of delays.

December 1999: Consultant says adding railway access would cost \$3 billion.<sup>85</sup>

December 1999: White House orders Army Corps of Engineers to begin independent analysis of project.

January 2000: Mayor Willie Brown meets with White House to call for retrofit. So does UC Berkeley engineering Professor Abolhassan Astaneh-Asi, who says the new design is not earthquake-safe.<sup>86</sup>

May 2000: White House orders Navy to give disputed land to Caltrans. This decision was not formally announced for five months.

September 2000: Army Corps of Engineers endorses a new bridge and northern alignment, with qualifications.<sup>87</sup>

October 2000: Environmental meeting between federal government and Caltrans takes place after delays of more than a year.

April 2000: Federal Highway Administration commissions Army Corps of Engineers to study bridge design.

April 2001: Caltrans tells Legislature the new cost is \$1.462 billion more than the last estimate, for a new total of \$2.747 billion. Caltrans attributes new estimates to more design information, previous omission of inflation costs, “acceleration” costs, MTC choice of bridge design, one-year Navy delay to get sample drillings on Yerba Buena, and a second year-long delay for environmental studies required by federal agencies. Then Caltrans Director Jeff Morales says these are “high-end

<sup>85</sup> **Link to rail study** [http://www.mtc.ca.gov/planning/bay\\_bridge/rail\\_study/exec\\_summ.htm](http://www.mtc.ca.gov/planning/bay_bridge/rail_study/exec_summ.htm)

<sup>86</sup> Professor Astaneh is aggrieved by suggestions that he designed and submitted an alternative bridge proposal and by the well-known backroom talk by state and local transportation officials who privately suggest his critiques are simply sour grapes. Astaneh says the design he suggested is not his but an alternative to the one that is built and that he is on record as saying is not safe.

**Link to Astaneh** <http://www.ce.berkeley.edu/~astaneh/>

<sup>87</sup> **MTC response** [http://www.mtc.ca.gov/planning/bay\\_bridge/bbmemo\\_sep22.htm](http://www.mtc.ca.gov/planning/bay_bridge/bbmemo_sep22.htm)

numbers.” State Senate requests independent analysis of Caltrans cost estimates. MTC hires Bechtel Infrastructure Corp. to assist.<sup>88</sup>

May 2001: Federal Environmental Impact Statement released more than four years after process begins.

July 2001: Bechtel report says cost overruns could be \$190 million to \$440 million more on eastern span.

July 2001: Federal Highway Administration approves eastern span project, two years later than Caltrans had anticipated, allowing Department to begin contracting bid process.

September 2001: Tragedies of September 11 spark increases in bonding and insurance costs.

September 2001: AB 1171 (Dutra) decrees new spending plan, capping all California bridge seismic retrofit costs at \$5.085 billion.<sup>89</sup> AB 1171 funds the project by repealing the 2008 toll expiration. The bill also specifically banned bumping up the toll from \$1 for the project. If the cost of the bridge increased from this figure, Caltrans is required to report to Legislature within 90 days and explain why. AB 1171 relies on Caltrans’ eastern span estimate of \$2.6 billion, ignoring MTC estimate of \$3.1 billion. MTC also estimates completion for May 2007.<sup>90</sup>

January 2002: Construction on new Bay Bridge commences. Caltrans says it will be done in 2007.

June 2002: Caltrans pushes back completion date to 2009.

August 2002: State Auditor issues report concluding the Bay Area chose a more expensive design in the SAS.

March 2003: Caltrans says eastern span estimate of \$2.6 billion now \$2.95 billion.

<sup>88</sup> [Link to Bechtel study http://www.mtc.ca.gov/legislation/seismic/Bechtel-Report.pdf](http://www.mtc.ca.gov/legislation/seismic/Bechtel-Report.pdf)

<sup>89</sup> [Link to AB 1171 http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab\\_1151-1200/ab\\_1171\\_bill\\_20011014\\_chaptered.html](http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab_1151-1200/ab_1171_bill_20011014_chaptered.html)

<sup>90</sup> Most of these major jumps in costs and delays were first reported by news accounts in Bay Area news media, not by public officials.

August 2003: Caltrans receives one bid for the SAS foundation, which comes in at \$210 million, 63 percent higher than Caltrans estimate of \$129 million. (See May 2004).

October 2003: Caltrans rejects single bid, saying it is too high, and hires another independent review committee to analyze bidding process.

November 2003: Caltrans says eastern span will be \$2.98 billion and will open 2011.

March 2004: Bay Area voters approve Regional Measure 2,<sup>91</sup> adding another \$1 to \$2 toll. Money will be used for a variety of traffic relief measures.

April 2004: The Independent Review Committee (appointed October 2003) says SAS may cost \$1.5 billion, not \$800 million Caltrans estimated.

May 2004: Only one bid on SAS tower contract. Estimate had been \$1.4 billion (foreign steel) and \$1.8 billion (domestic steel). This is about twice the Caltrans estimate of \$733 million.

August 2004: MTC-commissioned Bechtel report concludes there is no point in rebidding or redesigning.

August 2004: Caltrans says \$2.6 billion cost is now \$5.13 billion. Department cites higher labor and materials costs, higher insurance and bonding costs.<sup>92</sup>

August 2004: Internal Caltrans review says it has spent \$500 million on outside consultants studying issues raised about the bridge construction.

September 2004: Fitch Ratings Agency predicts \$6 tolls to cover proposed bond debt.

September 2004: Governor Arnold Schwarzenegger administration asks Federal Highway Administration for a peer review team to conduct a risk study on all alternatives. The Independent Review Team, used by the administration for other

<sup>91</sup> [Link to RM 2 http://bata.mtc.ca.gov/projects/rm2.htm](http://bata.mtc.ca.gov/projects/rm2.htm)

<sup>92</sup> Once again, the public learns of this through news accounts not through any announcements by state officials.

bridge studies, is reactivated to look at the single-bid situation. In the same month it recommends not accepting the single bid.

November 2004: Independent Review Team recommends cable-stayed bridge.

December 2004: Federal Highway Administration peer review team concludes construction risks lowest with SAS, and cable-stayed is most risky. But those risks have to do with public acceptance. Regarding cost overruns and delays, the highest risk is SAS and lowest is the skyway alternative.<sup>93</sup>

December 2004: Caltrans recommends staying with SAS, while warning “the potential for cost increases is also high.” Skyway would be cheaper but fighting over it could lead to long, costly delays while another significant earthquake could strike in the meantime.

December 2004: Schwarzenegger administration proposes dropping the SAS alternative and going with the skyway.

January 2005: The Results Group study suggests bridge will cost \$5.3 billion.

July 2005: Enactment of AB 144 (Hancock) creates the Toll Bridge Program Oversight Committee (TBPOC).<sup>94</sup>

July 2005: TBPOC first meeting. It votes to “decline” the one bid on the SAS and agrees to add \$3 million incentives for three lowest bids to attract more competition.

November 2005: Work on the marine foundation of the SAS and the Yerba Buena Island detour<sup>95</sup> is suspended while the Legislature debates next steps.

May 2006: TBPOC awards main SAS contract to the consortium American Bridge/Fluor (ABF).

February 2008: TBPOC minutes indicate Chinese welding issues arise.<sup>96</sup>

<sup>93</sup> [Link to FHWA study http://www.dot.ca.gov/baybridge/PRT\\_Final%20Report.pdf](http://www.dot.ca.gov/baybridge/PRT_Final%20Report.pdf)

<sup>94</sup> [Link to AB 144 ftp://leginfo.public.ca.gov/pub/05-06/bill/asm/ab\\_0101-0150/ab\\_144\\_cfa\\_20050713\\_160936\\_asm\\_floor.html](ftp://leginfo.public.ca.gov/pub/05-06/bill/asm/ab_0101-0150/ab_144_cfa_20050713_160936_asm_floor.html)

<sup>95</sup> Known to Bay Area drivers as the notorious “S curve.”

<sup>96</sup> For a full discussion of this controversial and significant issue, see page 9

September 2008: Quality assurance<sup>97</sup> team finds problems with anchor bolts during Ohio inspection.<sup>98</sup>

December 2008: CCO 77 for \$13 million is approved by TBPOC.<sup>99</sup>

December 2008: TBPOC awards a \$40 million contract to Caltrop, which subsequently subcontracts quality assurance work to Alta Vista Solutions.

March 2009: Bridge tolls are increased. “Drastic measures” for Chinese delays discussed in TBPOC meeting.

May 2009: Cracks are discovered on existing eastern span of Bay Bridge, resulting in a proposed eyebar replacement strategy that initially failed and eventually cost \$15 million.

July 2009: Caltrans Director and TBPOC member Will Kempton tells ABF<sup>100</sup> it has “an unhappy client.”<sup>101</sup>

July 2010: Bay Bridge tolls climb to \$6 during peak hours.

August 2010: The single most expensive contract change order, CCO 160, approved by TBPOC.

October 2011: Discovery of water in bicycle/pedestrian path segments and steel rods affixing path to bridge.

November 2011: Foundation issues upset TPBOC because Caltrans had not reported the issue to them.

December 2011: Caltrans signs \$21 million quality-assurance contract with Alta Vista Solutions.

<sup>97</sup> Quality assurance takes place after quality control. Quality control is typically the responsibility of the contractor, while quality assurance is typically the responsibility of the owner — in this case, Caltrans on behalf of the people of California. Quality assurance is essentially double-checking to ensure contracted quality standards are met.

<sup>98</sup> For a full discussion of this controversial and significant issue, see page 31

<sup>99</sup> For a full discussion about the approximately 1,500 change orders on the bridge, see page 20

<sup>100</sup> American Bridge/Fluor is the prime contractor for the bridge fabrication in China.

<sup>101</sup> From TBPOC minutes.

March 2013: Bolts issue revealed to public.<sup>102</sup>

September 2013: Bridge opens to traffic. Retrofits begin almost immediately.<sup>103</sup>

<sup>102</sup> The press, rather than public officials, once again revealed this issue.

<sup>103</sup> This timeline is part compilation of many previously assembled timelines and part original material.

## **APPENDIX 2: LIST OF INDIVIDUALS**

### **James Merrill –**

Quality Assurance Consultant for MACTEC

Involved with the bridge project from the 1990s to 2008

### **Steve Heminger –**

Executive Director of the Metropolitan Transportation Commission and the Bay Area Toll Authority (BATA)

### **Phil Stolarski –**

Caltrans Principal Transportation Engineer; Deputy Division Chief of the Materials Engineering and Testing Services

### **Peter Siegenthaler –**

Caltrans Principal Bridge Engineer and Area Construction Manager (retired)

Involved with the bridge project from 1999 to 2011

### **Tony Anziano –**

Caltrans Toll Bridge Program Manager

Involved with the bridge project from 2006 to present

### **Douglas Coe –**

Caltrans Supervising Bridge Engineer

Involved with the bridge project from 2001/2002 to 2009 (specifically on the East Span)

### **Mazen Wahbeh –**

Alta Vista Solutions principal and quality assurance consultant

Involved with the bridge project from since 2007

### **Keith Devonport –**

Welding consultant

Involved with the bridge project from 2007/2008 to 2010

### **Alan Cavendish-Tribe –**

Welding engineer and consultant providing oversight analysis for BATA

Involved with the bridge project from 2007 to present

**John Kinsey –**

ASNT Level III Technician

Involved with the bridge project from 2007 to unknown

**Ken Terpstra –**

Caltrans Principal Transportation Engineer and Project Manager

Involved with the bridge project from 2006 to present

**Bill Casey –**

Caltrans Supervising Transportation Engineer, Area Construction  
Manager/Resident Engineer

Involved with the bridge project from 2002 to present (in current role since 2010)

**David McClary –**

Welding Consultant

Involved with the bridge project from 2007/2008 to unknown

**Mike Forner –**

Caltrans Transportation Engineer and Area Construction Manager

Involved with the bridge project from 2006/2007 to 2012

**Gary Purcell –**

Caltrans Supervising Transportation Engineer and Resident Engineer on the Self-  
Anchored Suspension

Involved with the bridge project from 2006 to 2010

**Rick Morrow –**

Caltrans Supervising Bridge Engineer

Involved with the bridge project from 2002 to 2012/2013

**Richard Land –**

Caltrans Chief Deputy Director (Retired)

Potentially involved with the bridge project from early 2000s to present (became  
Chief Engineer in 2005)

**Malcolm Dougherty –**

Caltrans Director

Involved with the bridge project from 2011 to present

**Mark DeSaulnier –**

California State Senator

**Michael Mayes** –

Testing Consultant

Involved with the bridge project from 2008 to 2009

**Peter Campbell** –

MACTEC/ AMEC Corporate Manager

**Patrick Lowry** –

Alta Vista Solutions Consultant for Materials Engineering and Testing Services  
Division

Involved with the bridge project from 2002 to present (specifically, for Alta Vista  
Solutions since 2008)

**Will Kempton** –

Caltrans Director

Involved with the bridge project from 2004 to 2009

**Brian Maroney** –

Toll Bridge Program Chief Engineer

Involved with the bridge project from the early 1990s to present

**Chris Traina** –

Supervising Bridge Engineer

Involved with the bridge project from 1994 to present

**Karen Trapenberg Frick** –

Assistant Director of the University of California Transportation Center at  
Berkeley

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NTTNP author [Roland De Wolk](http://RolandDeWolk.com) (<http://RolandDeWolk.com>) is a veteran Bay Area journalist specializing in investigative topics. He is a reporter, news producer, author, and university journalism teacher. He is the recipient of many honors, including the Society of Professional Journalists Career Achievement award.