

DEPARTMENT OF TRANSPORTATION

Various Factors Increased Its Cost Estimates for Toll Bridge Retrofits, and Its Program Management Needs Improving

REPORT NUMBER 2004-140, DECEMBER 2004

Department of Transportation response as of December 2005

Audit Highlights . . .

Our review of the Department of Transportation's (Caltrans) Toll Bridge Seismic Retrofit Program (program) found that:

- Cost estimates have increased \$3.2 billion since April 2001, including a \$900 million program contingency reserve.*
 - Approximately \$930 million of the \$3.2 billion increase relates to the May 2004 bid for the superstructure of the signature span of the San Francisco-Oakland Bay Bridge's east span (East Span); the remainder is attributable to other categories.*
 - Various factors have driven cost increases, including volatile markets for steel and contractor services, a lengthening of the East Span's timeline, and Caltrans past experience with the program, which is reflected in contingency reserves.*
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The Joint Legislative Audit Committee (audit committee) requested that the Bureau of State Audits examine the delays and higher cost estimates for the Toll Bridge Seismic Retrofit program (program). Specifically, the audit committee requested that we identify the factors contributing to additional capital and support cost increases, which of these factors were unforeseen at the time that the AB 1171 estimates were prepared, and the extent to which the design of the signature span of the San Francisco-Oakland Bay Bridge's east span (East Span) independently contributed to costs increases. In addition, the audit committee requested that we examine Caltrans' basis for the program's schedule, evaluate the adequacy of procedures for modifying cost estimates and completion dates, and determine whether Caltrans employs best practices when managing projects that cost more than \$1 billion. Specifically, we found:

Finding #1: Rising costs and delays plague completion of the State's largest public safety project.

In its August 2004 report to the Legislature on the status of the program, Caltrans disclosed cost estimates that were \$3.2 billion, or about 63 percent, higher than the estimates it prepared in April 2001. Caltrans' 2001 estimates formed the basis for the program budget the Legislature adopted in AB 1171. Caltrans' reevaluation of program costs was triggered in May 2004 by receiving the sole bid for the signature span's superstructure, which exceeded Caltrans' 2001 estimate by \$930 million. Caltrans' revised cost estimate for individual toll bridges was about \$2.8 billion more than the cost estimates used for AB 1171, while the estimated program contingency reserve rose by \$452 million.

The East Span accounted for most of the increases with \$2.5 billion more in estimated costs. In turn, the East Span's signature span component was estimated to cost \$1.3 billion more. Since 2001, the East Span also has been the source of the program's longest schedule delays and this delay can be attributed almost entirely to the signature span. Caltrans postponed the bid opening for the signature span's superstructure by almost one year, and agreed to give contractors three more years than it originally envisioned to complete it.

Finding #2: Various factors contributed to higher cost estimates and delays.

No one factor alone caused the significant rising cost estimates affecting the seismic retrofitting of selected toll bridges. The multiplicity of factors, along with the limited access Caltrans has to the proprietary data that supports contractors' bids, makes it difficult to attribute dollar effects to specific causes. Nevertheless, comparing Caltrans' two cost estimates, from 2001 and 2004, we found that much of the program's cost increases occurred in several areas. Estimates for structural steel, contractor overhead, and contingency reserves for the East Span's skyway and signature span increased by \$598 million, \$585 million, and \$207 million, respectively. In addition, estimates for the program's support costs rose \$556 million and the program contingency reserve increased by \$452 million.

Contributing to the higher cost estimates have been volatile markets for materials and contractor services, which have yielded bids that include higher than expected steel and contractor overhead costs. For example, we estimated that a 26 percent increase in steel prices in 2004 added \$95 million to structural steel costs. With regard to the remaining cost increases in these areas, Caltrans said it believes the bidding contractor may have added on a margin to its materials costs to cover other project costs not identified individually in the project bid items. Caltrans said that future significant material escalations, bonding and insurance costs, and the perceived risk of the project might have been included in such a margin. Caltrans also said that market conditions after September 11, 2001, led to higher insurance and bonding costs, and greater scrutiny of risk on large projects, which has contributed to higher overhead bid amounts.

Schedule delays and contract extensions also increased contractor overhead and Caltrans support costs. Caltrans' efforts to increase competition among contractors by extending the bidding period for the signature span's superstructure, and its lengthening of the time allowed for contractors to complete this contract, pushed out the program's completion date by four years. These changes indicate that the signature span's superstructure was more complicated than Caltrans originally envisioned and so could be expected to use considerably more administrative resources.

In addition, Caltrans established contingency reserve amounts for the skyway, signature span, and the Richmond-San Rafael Bridge that are significantly higher than contingency reserve levels of more typical projects, reflecting the greater amount of risk these projects have for schedule delays and cost overruns. Caltrans determined these contingency reserve amounts based on the results of a probabilistic risk analysis model

for construction costs used by a consultant. This represents the reserve level that the consultant concluded was required to provide an 80 percent likelihood that the program cost estimate will not be exceeded.

Finding #3: By not consistently following risk management best practices, Caltrans has not addressed the East Span project's risks adequately.

Even though Caltrans has acknowledged that risk management is an essential component of project management, it has not focused sufficiently on managing the risks of the East Span, including the self-anchored suspension component, or signature span. Caltrans did not create a risk management plan to define how it would identify, prioritize, quantify, respond, and track risks for the project. Although Caltrans identified certain risks and opportunities through quality assurance, risk analyses, and information sessions with potential suppliers, steel fabricators, and contractors, Caltrans has not performed some of the major processes—planning, tracking, and quantifying—necessary to maximize the chances of positive rather than adverse events in the East Span project.

In October 2004, Caltrans put together a summary that is supposed to be the risk management plan for the East Span project. This summary includes primarily a historical description of methods Caltrans used to identify risks, and names of individuals who are a part of its Project Quality/Risk Assessment/Oversight Group. However, the summary omits how Caltrans will perform key risk management processes. For example, it does not define how Caltrans will identify and quantify risks throughout the life of the project and how risk activities will be documented and tracked. Moreover, Caltrans created this summary especially for us, so it was not actually used as the plan to manage the East Span project's risk.

Further, Caltrans did not update its cost estimates to incorporate quantified risks identified through project analyses. Three of the five analyses it initiated included such information. According to Caltrans' director, after AB 1171 became law, Caltrans managed to the budget set in the bill by mitigating potential risks. He stated that since 2001, the cost update in Caltrans' August 2004 report included its first program-wide cost update and that an August 2004 cost review performed by an outside consultant was the only program-wide quantitative risk analysis.

We recommended that the department establish a comprehensive risk management plan, quantify the effect of identified risks in financial terms, and establish documents to track identified risks and related mitigation steps.

Caltrans' Action: Partial corrective action taken.

With the assistance of consultants, Caltrans indicates that it prepared a risk management plan for the East Span project. Caltrans also says that it hired a dedicated project risk management coordinator to ensure implementation of the plan. As part of the plan, Caltrans developed a comprehensive list of risks, called a risk register, and has created draft risk registers for the signature span, and the eastern foundation and tower subprojects. Caltrans states that it is developing monitoring and control processes to identify, analyze, and plan for new risks and to track all existing risks. In its latest quarterly program report, dated November 14, 2005, Caltrans, however, noted that some of the risks identified in the risk register cannot be quantified because they are conditions or assumptions on which the project was planned. Caltrans says that any changes to these conditions or assumptions would require revisions to budgets, plans, and other performance measures. Further, Caltrans says it has not quantified some risks that are external in nature and represent possible policy changes that might be imposed on Caltrans. Finally, as conditions warrant, such as recent market fluctuations and the suspension span bid opening, Caltrans states it will update risk probabilities, potential impacts, and response strategies.

Finding #4: Caltrans does not regularly update program cost estimates to monitor the program's budget appropriately.

In managing the project's cost, Caltrans has not followed generally accepted cost management practices to ensure that the project could be completed within its 2001 budget, approved by the Legislature in AB 1171. Caltrans did not regularly update its cost estimates for some components of the East Span or the entire program, including updating estimates for capital and support costs. Also, Caltrans did not use information about identified risks to regularly reassess its contingency reserves for potential claims and unknown risks. For example, Caltrans indicated to the Federal Highway Administration (FHWA) in February 2004 that its program support costs would be \$766 million, \$30 million less than the AB 1171 estimated amount. However, Caltrans' accounting records show that it already had spent \$612 million in support costs by October 2003, leaving only \$154 million to pay such costs for eight more years, through 2011. Just six months later, in August 2004, it raised its estimated support costs to \$1.352 billion.

Without updated cost estimates, Caltrans' program managers forego the benefits of a detailed overview of the program's capital and support costs for all the bridges. Further, Caltrans indicates that since October 2001, when AB 1171 was passed, its only published program-wide cost update was its August 2004 report to the Legislature, which disclosed the \$3.2 billion cost overrun. Had it been monitoring the program's costs regularly, Caltrans would have realized much earlier that the program was exceeding its budget under AB 1171.

We recommended that the department update its estimates of capital and support costs, reassess its contingency reserves for potential claims and unknown risks, and integrate this information into a program-wide report on a regular basis.

Caltrans' Action: Corrective action taken.

Caltrans says that during 2005 it updated capital outlay and capital outlay support costs each quarter and integrated them into its reports to the Legislature. Caltrans indicates that it updated the cost estimates for contracts currently under construction and that it considered cost exposure associated with identified individual risks when revising its engineer's estimate for the East Span. Further, it says that it will periodically determine if remaining contingency reserves are adequate to cover the amount of the program's remaining risks.

Finding #5: Caltrans did not employ good communications management, resulting in the failure to report cost overruns to stakeholders in a timely fashion.

Caltrans has neglected communications planning and management, failing to inform significant stakeholders regularly of relevant changes in its estimates of program costs and cost overruns. State law requires Caltrans to provide periodic status reports to the Legislature, but Caltrans provided no statutorily required annual status report for 2003 and no statutorily required quarterly status report in 2004 until August of that year. It chose not to disclose program information according to the regular reporting schedule established by law and disclosed the large cost overruns long after it should have known that the program likely would exceed its budget. As a consequence, Caltrans placed the Legislature in the awkward position of having to try to devise a funding solution six weeks before the bid on the signature span's superstructure was set to expire.

In November 2003, Caltrans submitted a legally required financial plan update to FHWA showing that the program's projects were going beyond the AB 1171 cost levels and that less than a 3 percent program contingency reserve remained. In response to FHWA's questions, Caltrans did not reveal the probable extent of estimated program costs. Based on internal Caltrans' reports and the amounts it eventually reported to the Legislature in August 2004, Caltrans should have known about the huge cost overruns. For example, although Caltrans had advertised the contract for the signature span's superstructure at \$733 million, internal analyses showed that as early as August 2002 this contract could be as high as \$934 million, while later estimates placed its potential price at more than \$1 billion. Further, the uncommitted balance of \$122 million in the contingency reserve was grossly insufficient given that Caltrans had not received the superstructure bid, the East Span's skyway was only 31 percent constructed, and the Richmond-San Rafael Bridge retrofit costs were underreported by \$43 million to \$78 million.

In addition, Caltrans provided no information on potential program funding shortfalls before May 2004 to the Metropolitan Transportation Commission, a critical stakeholder that represents the commuters who pay to use the toll bridges.

We recommended that Caltrans submit quarterly status reports to the Legislature as the law requires, ensure that reports to FHWA and other stakeholders provide an accurate representation of the program's status, and quickly inform stakeholders when key events affect the program's overall budget and schedule.

We recommended that the Legislature require Caltrans to submit quarterly reports within a given time period, and that it require Caltrans to certify these reports and to include additional financial information in them. Also, in reviewing the options to complete the East Span, we recommended that the Legislature consider requesting that Caltrans provide sufficient detail to understand the financial implications of each option, including a breakdown of costs for capital outlay, support, and contingencies at the project and program level.

Caltrans' Action: Corrective action taken.

During 2005 Caltrans submitted program status reports to the Legislature between 45 and 48 days after the end of each quarter. Caltrans indicates that it provided these reports to the FHWA in addition to the federally required Annual Update to the Finance Plan for the East Span, which it provided to the federal government on November 16, 2005.

Legislative Action: Partial legislation enacted.

Assembly Bill 144 (AB 144), approved by the governor in July 2005, provided funding for the completion of the signature span of the East Span. It also established a Toll Bridge Program Oversight Committee that is to provide reports to the Legislature within 45 days of the end of each quarter. The reports are to provide details on each toll bridge seismic retrofit project and all information necessary to clearly describe the status of the project, including the current or projected budget for capital and capital outlay support costs. However, AB 144 does not require these reports to provide the level of detail we recommended, such as reporting on pending change orders or other contractor claims; commitments against the project and program contingency reserves; current estimates of contract values that are not yet entered into; and a detailed description, along with specific financial estimates, of issues or events that could have a financial impact on the program. In addition, AB 144 does not require certification by key Caltrans executives—the director and deputy director of finance—and an independent engineering consultant on the completeness and accuracy of the report as we had recommended.