Report to the Legislature

California Department of Transportation
Worker-Safety Improvements

Prepared by the California Department of Transportation
Division of Maintenance
Division of Research and Innovation

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March 2009

Introduction

The Supplemental Report of the 2008 Budget Act requires the California Department of Transportation (Department) to report on the following efforts:

2. ***Worker-Safety Equipment.*** The Department shall report by March 1, 2009, on the implementation of worker-safety improvements, including those approved in the *2008-09 Budget Act*. The report shall include, but not necessarily be limited to, the following:

   (a) An update concerning the purchase and use of the Balsi Beams systems and mobile barrier systems, including the final costs compared to the budget estimates, the to-date geographical and frequency use of the systems, and the on-going plan to use these systems.

   (b) A description and estimated cost of the administration's plan to purchase additional systems, as applicable.

   (c) A description of any revenues received and/or authorized use.

Overview

According to the 2006 California Strategic Highway Safety Plan and California Highway Patrol data, there has been an average of 121 work zone fatalities between the Department's work force and the traveling public each year between 2000 and 2005. The highest annual count of 155 was realized in 2005—up from 109 the prior year. These figures, coupled with the projected 20 percent increase in annual vehicle miles traveled identified in the 2007 Ten-Year Statewide Highway Operations and Protection Plan, clearly emphasize the immediate need for improved work zone safety.

Work zone safety has always been one of the Department's top priorities. As such, the Department's executive and management levels support initiatives that result in direct, positive impacts on improving worker-safety. Current measures include the use of cones, water-filled barrels, signage/lighting, and shadow vehicles with truck-mounted attenuators (a portable impact attenuator attached to

the rear of a large truck used as a shield to prevent errant vehicles from entering the work zone). The need for better work zone protection and the implementation of worker-safety improvements are critical to reducing fatalities and injuries on the roadway, especially given the rise in vehicle miles traveled.

Since 2002, the Department has experienced nine worker fatalities in its work zones along with an average of 1,000 highway worker work zone injuries per year. Recognizing the trends in work zone injuries and traffic congestion, the Department identified the need to improve work crew, public safety, and traffic mobility issues related to shoulder and median work performed on California's roadways. Failure to address these trends will result in the Department's inability to provide its workers and the traveling public with the safest highway work environment or to help reduce traffic congestion.

The Department was approved for a fiscal year (FY) 2008/09 Budget Change Proposal (BCP) for Worker-Safety Improvements (see Appendix A) to purchase and deploy six mobile work zone protection devices (three Balsi Beams and three Barrier Systems, Inc.'s ArmorGuard mobile barrier systems [ArmorGuard]) that will provide immediate and improved safety to roadway workers and the public, reduce fatalities in work zones, and reduce traffic congestion and delay time resulting from roadway work zones.

A Balsi Beam is a modified semi-tractor trailer that consists of high-strength steel-box sections and telescoping beams that are capable of being extended. The system is transported by a semi-tractor and provides a corridor of protection from both upstream traffic and lateral work zone intrusions. An ArmorGuard is a steel barrier system developed by Barrier Systems, Inc., and is designed to create a portable barrier that can be moved and reconfigured. It is designed to function as a stationary or mobile work zone and it can be towed or pulled longitudinally as the work zone changes. These six barrier system units are planned to be used by the Department's Districts 5, 8, and 11 bridge maintenance crews.

As part of its continued efforts to maximize safety and to comply with the requirements from the Supplemental Report of the 2008 Budget Act, the Department would monitor the use and effectiveness of both the Balsi Beams and ArmorGuard systems for one year so that a determination can be made on whether to purchase additional Balsi Beams, additional ArmorGuards, or both. The two products will be tested in the same work environment to demonstrate the effectiveness of each device and to help determine the need for additional Balsi Beams or ArmorGuards in the future.

Status of Procurement and Updated Costs

The Department initiated the procurement process for the six mobile barrier systems in late September 2008, shortly after the enactment of the FY 2008/09 Budget Act.

For the three Balsi Beam systems, the Department submitted the purchase requests to the Department of General Services in October 2008. Even though these requests have not yet gone out for bid, the Department anticipates delivery of the first of the three units in August 2009 at an estimated cost of $667,000 per unit (the same amount identified in the FY 2008/09 BCP).

To procure the ArmorGuard system, the Department must go through the sole source procurement process. The Department worked with Barrier Systems, Inc. to standardize the product design and specifications and received the product quotes on November 21, 2008. The Department is finalizing the final procurement package for approval. The Department anticipates a delivery schedule to be established once the purchase contract is approved at the estimated cost of $100,000 per unit (the same amount identified in the FY 2008/09 BCP).

Plan to Purchase Additional Systems

The Department's plan to acquire additional systems will be based on an evaluation that is being conducted by the Advanced Highway Maintenance and Construction Technology (AHMCT) Research Center at the University of California in Davis. A similar evaluation was conducted by the AHMCT to determine the effectiveness of the Balsi Beam. The goal of the evaluation is to develop a scientific and business basis for deployment of the ArmorGuard in highway operations in California based upon their superior mobility to K-rails and compare the cost benefit of ArmorGuard to Balsi Beam.

The Department and AHMCT have begun this evaluation and held an initial demonstration of ArmorGuard system on December 10, 2008. Based on initial findings (see Appendix B) from the December 10, 2008, field evaluation and partial injury and accident reports, Balsi Beam has advantages over ArmorGuard in cases of short-duration and short-length work zones, while for long-duration and long-length work zones ArmorGuard is more appropriate than Balsi Beam. AHMCT does indicate these findings as tentative and will update all findings as further field evaluations are conducted and more data obtained. AHMCT plans to perform additional demonstrations throughout 2009 and will provide quarterly reports, with a final evaluation expected in June 2010.

Once the Balsi Beams and the ArmorGuard have been acquired and been in use for a year, the Department can review the data associated with the implementation of both safety barrier systems and propose a plan for the procurement of additional Balsi Beam and/or ArmorGuard systems.

Revenues and/or Authorized Use

The Department is developing solicitation documents to identify and license qualified vendors capable of manufacturing and selling Balsi Beams to potential customers. Intellectual property funded by the State is the personal property of the State. As such, under California Constitution Article XVI, section 6, the State must sell its property at fair market value so as to not violate the prohibition against making gifts of public funds or property. The Department has determined that the appropriate method for compensation is to establish a royalty rate for each unit sold.

The Department has sold a license agreement to the North Texas Tollway Authority for the use of the plans and specifications to construct a Balsi Beam. The revenue of $19,000 was used to partially recoup departmental costs for conducting the transaction and obtaining and maintaining the patent that the Department already owns.

Additional Worker-Safety Improvements and Enhancements

In FY 2007/08, the Department organized a Safety Task Force to research and evaluate additional safety improvements and enhancements for implementation to continuously improve safety to employees and the traveling public. This task force is made up of staff from various field and headquarters classifications to address safety needs. Since the inception of the task force, the following improvements have been initiated:

- Additional truck-mounted crash cushions, arrow-boards, and changeable message signs have been purchased and installed.
- The Department's Maintenance Manual (Chapter 8) has been revised. The revision includes "Any short-term work done in a gore zone will require the use of a barrier or shadow vehicle equipped with a truck-mounted crash cushion and there must be a lookout."
- The increased use of the California Highway Patrol traffic breaks for all multi-lane highways when a safe natural break in traffic is not available.
- The concept of "extreme maintenance" is now used. The Department will employ all available crews to concurrently complete tasks on a section of highway. This should eliminate the need for multiple closures and reduce the time employees are exposed to live traffic.
- The use of herbicides has been minimized. Following a thorough evaluation of alternatives, herbicides shall be used only if vegetation control becomes a safety issue. While continuing to reduce the use of herbicides, the important role pesticide application plays in reducing

employee exposure to live traffic when performing vegetation control must be kept in mind.

- Alternative strategies for freeway sign repair have been developed to minimize employee exposure while repairing these signs.

The Safety Task Force efforts continue to ensure safety improvements evolve as issues and potential roadway risks arise. Many of these safety improvements are the result of suggestions from dedicated Department employees.

Future Updates for Worker-Safety Improvements and Enhancements

The Department can provide further updates regarding the procurement of the six barrier systems, the evaluation of ArmorGuard, or additional departmental worker-safety improvements and enhancements upon request. The Department plans to continue its efforts as described within this report, and remain consistent with the plan described in the FY 2008/09 Worker-Safety Improvement BCP (see Appendix A). The Department will remain committed to the safety and reduction in fatalities and injuries for both the Department and the traveling public.