

General Construction Company Lake Washington Anchor Cable Replacement



Nomination Form

“Partnership for Excellence in Contract Administration”
Award

Contract Number: 7802

Project Name: Lake Washington Floating Bridge Anchor Cable Replacement

Contractor Name: General Construction Company

Project Engineer: John Chi

Date Project Accepted: August 29, 2011

Category of Award (*please underline one category*):

Eastern Washington

- Projects Less than \$3,000,000
- Projects \$3,000,000-\$10,000,000
- Projects Greater than \$10,000,000

Western Washington

- Projects Less than \$3,000,000
- Projects \$3,000,000-\$10,000,000
- Projects Greater than \$10,000,000

Statewide

- Special Mention City/County or Other Project Administered by the WSDOT/Contractor Team
-

General Construction Company Lake Washington Anchor Cable Replacement



Project Overview

This project consisted of replacing 30 worn and corroded cables that attached the SR 520 and I-90 floating bridges to anchors in the bed of Lake Washington. Fifteen of these cables connected the SR 520 Albert D. Rosellini floating bridge and fifteen connected to the I-90 Homer Hadley floating bridge. The cables were replaced while the bridges remained open to traffic during construction activities. To accomplish this, the contract required that the bridge remain structurally stable during the replacements. Each cable replacement required a continuous operation with both day and night shifts to eliminate the possibilities of a problem occurring if the bridge was left unattended without a functional anchor cable. Additionally only one cable could be replaced at a time to limit the affected area of bridge to just one location at any time during the construction project.

A large majority of the construction work occurred underwater or inside the bridge pontoons. Water depths vary at each location from 20 ft. to 200 ft. The cables for SR 520 are 2 3/16 in. diameter and the I-90 cables are 2 3/8 in. diameter. Working in either of these locations presented special challenges such as deep dive depths with limited working time due to decompression requirements or confined spaces work regulations while working inside the bridge pontoons.

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Customer Focused Administration:

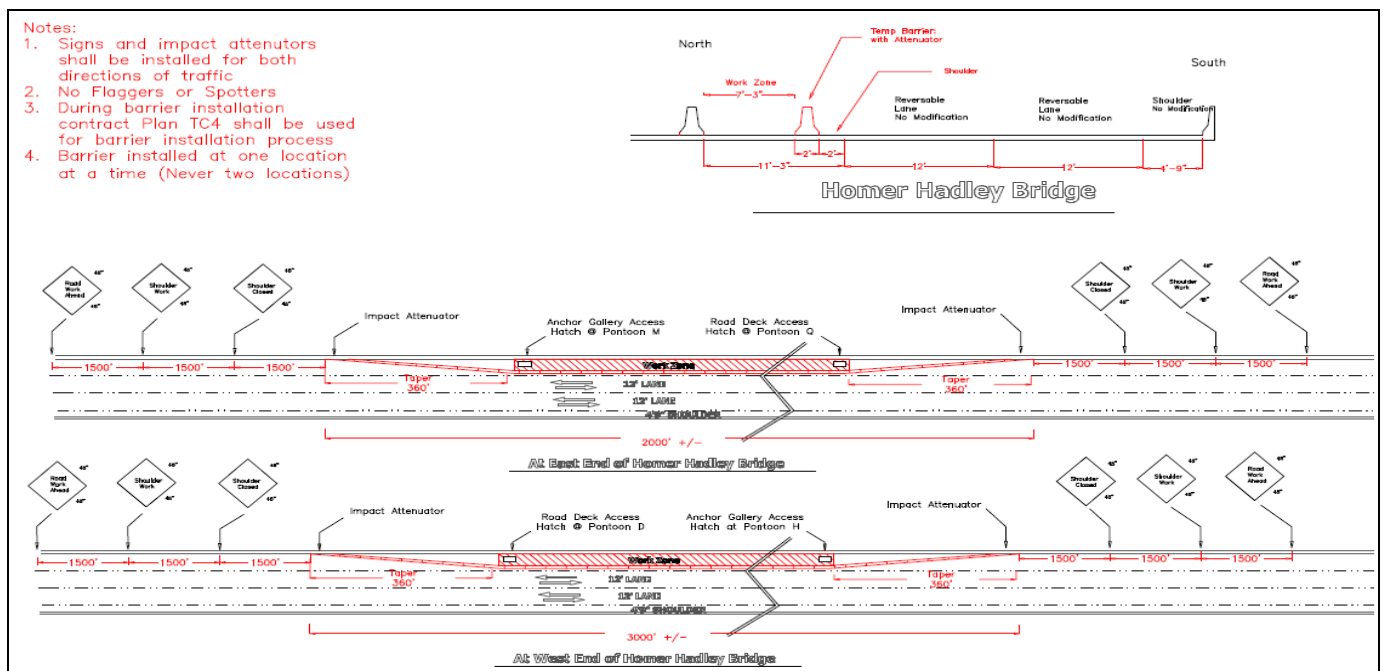
Through early meetings between General Construction Company and the WSDOT project team an excellent working relationship was formed allowing open discussions and collaborations. This relationship resulted in a project where all involved felt empowered to give input to the construction process which made it possible for General Construction Company and the WSDOT bridge maintenance group to perform their respective work on the bridges without conflicts.



WSDOT Bridge Supervisor Kirk Tullar opens chamber door

Kirk Tullar shows the door that leads from one chamber to the next inside the I-90 Homer Hadley Bridge.

General Construction Company worked closely with WSDOT project management to develop and implement a no cost change order that greatly reduced the impact experienced by the traveling public due to construction activities. This change effectively reduced the lane closures required from an estimated more than 20 closures to a required four closures while working on the I-90 bridge cable replacement. The team developed a means of accessing the bridge that did not require roadway closures. Because of this they were able to install an extensive system of temporary concrete barrier creating an enclosed safe work area on the bridge that did not require traffic control during construction operations and did not reduce the traveling lanes on the bridge deck.



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Innovative Problem Solving:

General Construction Company and WSDOT have a long history of successful projects relating to the floating bridges around the Puget Sound. These previous experiences dealing with the unique challenges that are associated with floating bridges made it possible for the General Construction Company team to develop the required plans, procedures, equipment and tools to complete this project successfully.

Through detailed planning General Construction was able to develop a standardized plan for mooring the work barge and derrick to both bridges without overstressing the bridge during cable replacement. Substantial engineering was required to ensure that the forces exerted during movement of equipment would not damage the floating structure. On the surface this sounds to be a fairly simple engineering task but the

SR 520 Bridge is in its later stages of its useful life span and any additional stress induced into the bridge was severely reduced because of this. General Construction designed and implemented a series of mooring points that reduced the forces using multiple connection points with load equalizing measures to ensure that the system would not damage either bridge.



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Prior to starting cable replacement operations General Construction developed detailed plans for each cable replacement which resulted in custom fabrications such as spooling machines and apparatus for gripping, pulling and tensioning anchor cables during the cable replacement operations. Without the tools and plans that were developed during the planning stages of the project it would not have been possible to have the successful operations experienced during cable replacements.

A few items that were specially constructed and developed prior to and during the project included; diver assisted cable socketing tools, epoxy socket pouring procedures, portable winches for inside the pontoon, and pulling apparatuses for gripping the new cable without damaging the coating.



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Overcoming Extraordinary Challenge:

Seven of the 15 cables replaced on the I-90 Bridge were located in a manner where they were over and



under other existing bridge cables. The contract specified that the replacement cables not be dropped onto the existing cables or that the new cable not be pulled over (rub) on the existing cable. These requirements resulted in a very challenging cable replacement operation. To facilitate this replacement a detailed step by step operation plan was developed and numerous special tools and equipment were built.

Replacing this type of cable alignment under the

restrictions given had not been attempted before by WSDOT or General Construction so planning was critical to ensure that the method chosen was successful. The General Construction team used a series of float and special rolling blocks to maintain the cable allowing it to weave through the existing cables while being pulled toward the bridge using a specially developed pull barge specifically constructed for this cable installation operation.



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Effective Contract Administration:

The project was successful from the upfront planning and a team effort by both General Construction Company and WSDOT to manage the work as well as the contract. Both teams focused on maintaining open lines of communication and solving problems at the lowest levels to eliminate delays and minimize costs. The project did encounter a minimal amount of changes that were handled immediately by both the contractor and WSDOT. Because of the teams excellent lines of communication and relationships developed during the early stages of the contract, the changes did not affect the project schedule and potential cost associated with the delays did not occur. Since the cable procurement was such a long lead item to purchase both teams had ample time to build these relationships. However, without the teams making an effort to have weekly meetings months prior to the start of construction this would not have been possible.

The vast majority of submittals were presented and approved early in the contract allowing the project team to focus on work rather than administration procedures. Weekly at the owners meeting submittals, RFIs and potential change order logs were reviewed and it was very uncommon to have any outstanding issues that were critical to the project. Beyond the weekly meeting General Construction Company and WSDOT management were discussing or meeting regularly to ensure that any upcoming administrative matters were being handled in a timely manner and insuring that the available resources were present to make sure that the tasks could be handled when administrative matters did arrive. At the time of project substantial completion there were no outstanding issues and project punch list and close out were easily completed with minimal amount of effort.

- *No schedule delay because of change order delays*
- *No outstanding issues during contract closeout*
- *Minimize cost though early planning and partnership*
- *Daily/Weekly contact eliminated possible delays*

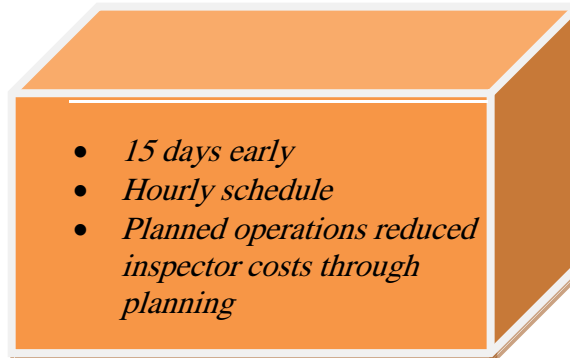
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Timely Completion of Project:

With the long lead time the anchor cables upon Construction immediately materials to ensure that with ample time to all the material was started as soon as possible



required for fabrication of project award General purchased the required the material would arrive complete the project after received. The project after the in-water work

restriction was lifted and had substantial completion 15 days prior to contract requirements. Prior to starting the project General Construction produced typical daily schedules outlining all the steps of a cable replacement through an hourly schedule from start to finish of a typical anchor cable. This allowed General Construction and WSDOT to plan crews during the continuous work operations and also limited unneeded resources when no night work was required.

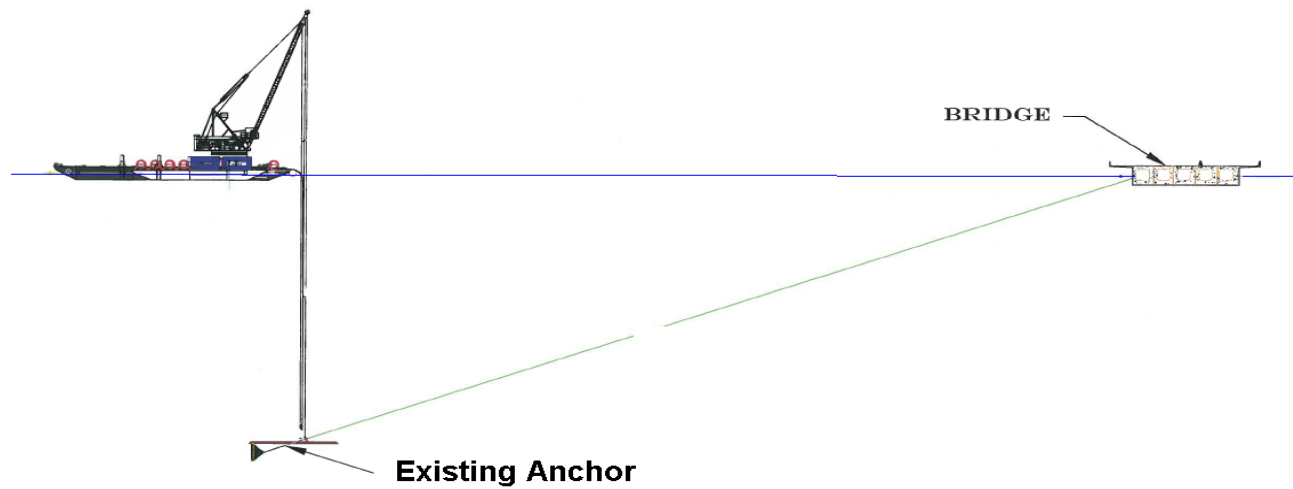
Safety:

This project was successful in completing over an estimated 15,000 man-hours without incident. No OSHA recordable accidents occurred while performing high risk operations such as deep diving and confined space entry. General Construction is dedicated to eliminating accidents through the use of "Job Hazard Analysis" program which involves all crew members during the development of work plan. From the top down General Construction minimizes risk of accident by demanding all levels of craft and staff to be involved in maintaining and developing safe work procedures for each and every operation. WSDOT project team also adopted General Construction safety procedures and attended General Construction's safety meetings held on a regular basis. All personnel who worked on the project received confined spaced training and lead exposure training and monitoring.

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Appendices

(Please attach appendices, 13 Reproducible Items Maximum)



General Construction Company Lake Washington Anchor Cable Replacement



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WSDOT completes anchor cable replacement on the Lake Washington floating bridges

Oct 26 2010

Just in time for windy fall weather, crews working for the Washington State Department of Transportation (WSDOT) have replaced 30 worn and corroded anchor cables on the I-90 and SR 520 floating bridges. The thick, steel cables connect the floating bridge pontoons to anchors in the bed of Lake Washington.

Crews replaced 15 of 52 cables on the I-90 Homer Hadley floating bridge and 15 of 58 on the SR 520 floating bridge. The cables, which help the bridges endure strong winds and pounding waves, were nearing the end of their design life. Worn or corroded cables pose a higher risk of snapping during a windstorm, which could lead to a long-term bridge closure.

"Replacing the frayed cables now will make sure the bridges remain safe for drivers this fall and winter and for years to come," said Ralph Dornise, WSDOT bridge engineer. "Because these bridges are so valuable to the public, we must make sure they are always in good working order."

Unlike a typical road project, much of the work to replace the anchor cables took place out of the public eye. Specially-trained commercial deep-sea divers hauled the cables as deep as 200 feet, removed the old cables and attached the new ones. Once each new cable was connected to its anchor on the lake bed, workers fastened them to the floating bridge pontoons.



The cable socket inside an SR 520 bridge pontoon. WSDOT photo
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Frayed, corroded cables holding the 520 floating bridge being replaced

Anchor cables on the Highway 520 Floating Bridge are being replaced over the next few weeks.

By Mike Lindblom
Seattle Times transportation reporter

The Highway 520 floating bridge on Lake Washington is nearing retirement, but the state is fighting waves and winds to the bitter end.

Fifteen of the old bridge's 58 anchor cables are being replaced this summer.

Many older cables are frayed or corroded, and could possibly snap in a windstorm, state engineers say. New pontoons are scheduled to arrive on Lake Washington in 2014, but that's not soon enough.

"It's only June of 2010; that's still 4 1/2 years. We could still have the storm of the century. The last thing you want would be to build the [new] bridge under duress," said Jamie Holter, a project spokeswoman. "We absolutely cannot do without this bridge."

At mid-lake on Tuesday, divers detached an old 2-3/16-inch diameter cable from an anchor, about 180 feet deep. A crane lifted it to the surface. A shiny new cable was attached at the lake bed, and the other end pushed through a hatch in the bridge — an exchange nicknamed "the handshake." Two workmen in a small skiff were being rocked by small waves deflecting off the 1.4-

The old cable was painted orange but also displayed blisters of rust. Sometimes, boats with propellers can damage the cables. Sometimes, boats with Stonecipher.

Cables prevent sudden movements of the bridge. They are held in place by hydraulic jacks inside the bridge.

General Construction of Puget Sound is replacing the cables. The cables being replaced number 15. Another 15 cables were replaced last year.

Tolling is scheduled to start next spring on the 1963-vintage four-lane 520 bridge, but that still leaves the state \$2 billion short of the total \$4.6 billion project cost for the entire new crossing from Bellevue to Seattle.

Mike Lindblom: 206-515-5631 or milindblom@seattletimes.com

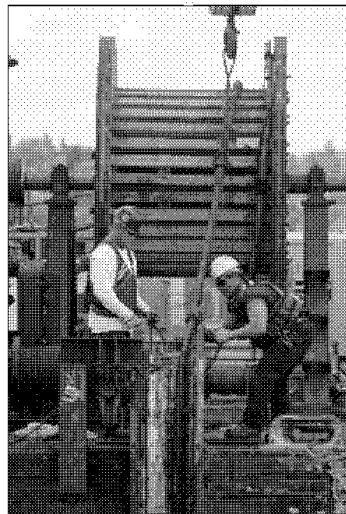
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Crews aboard a barge next to the 520 floating bridge on Tuesday are replacing frayed and corroded anchor cables that hold the bridge in place.



...ted, and one part looked like a bridge technician Jim Stonecipher.

...atch the lake level because of the bridge's anchor cables.

...so two barges in the lake. The work will continue through July. The new bridge, south of the 520 bridge.

Video



Motorcycle stunt team performs on viaduct
With the Alaskan Way Viaduct closed to traffic so that demolition could begin, Seattle's Cossacks Motorcycle Stunt and Drill Team was able to perform on the empty road. The team and the Rat City RollerGirls won a contest to spend 30 minutes there.



Inmates training to raise endangered butterflies



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Lake Washington Anchor Cable Replacement



John Chi

WSDOT Applicant Team Name (Please Print)

John Chi

WSDOT Applicant Team Signature

Brian Masten

Contractor Applicant Team Name (Please Print)

B. Masten

Contractor Applicant Team Signature

Completed nomination form, overview, narrative, and any other appendices must be received on or before October 28, 2011.

Mail to: Partnership for Excellence in Contract Administration Award
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