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Letter: The Interstate Bridge Replacement Program is hiding its 'Geotechnical Data Report'

Nov. 25, 2024

Bob Ortblad reports that the IBR's Supplemental Environmental Impact Statement includes 26 technical reports, but a critically important geotechnical report is missing, and the IBR has offered no explanation

Editor's note: *Opinions expressed in this letter to the editor are those of the author alone and do not reflect the editorial position of ClarkCountyToday.com*

The Interstate Bridge Replacement Program (IBR) is hiding a serious "boulder" problem that threatens the feasibility of the IBR's Columbia River bridge design. IBR's Supplemental Environmental Impact Statement includes 26 technical reports, but a critically important geotechnical report is missing, and the IBR has offered no explanation. I filed a Public Disclosure Request and obtained IBR's "Geotechnical Data Report" dated May 2024.

The IBR plans to support its bridge with a dozen piers. Each pier will need eight supporting shafts for a total of 96 in-river shafts. These shafts will be steel pipe piles 10-foot in diameter and up to 250 feet long. IBR plans to use a giant oscillating machine to twist piles back and forth, sinking them into about 200 feet of sandy sediment down to a solid Troutdale Formation.

Bob Ortblad

IBR's "Geotechnical Data Report" describes the encounter of many boulders and cobbles in a 200-foot layer of sediment. The report referenced boulders 106 times and cobbles 175 times. In 2012, the Columbia River Crossing spent $4.2 million to test a few piles and a single shaft. Malcolm Drilling Co. tried to sink a single 10-foot diameter steel casing down 250 feet on Hayden Island. In a trade journal, Malcolm Drilling recounted its failure to sink this test shaft due to boulders.

"The Columbia River Crossing Test Program," 2013

"However, during excavation and casing installation of the 10- foot diameter shafts, an unknown layer of very dense boulders in a "fixed condition," resulted in damage to an installation tooth ring to the point that excavation to the planned shaft depth was impossible."

IBR also plans to install 1,775 temporary 24-inch and 48-inch inriver piles to support a giant oscillating machine as it tries to sink 96 in-river 10-foot diameter shafts.

In 2012, each shaft was estimated to cost $1.25 million. Today, each shaft will cost $2.5 million. If many boulders are encountered the cost per shaft could soar even higher. The cost of bridge drilled shafts is very unpredictable ranging from $250 million to $500 million.

An Immersed Tunnel alternative that the IBR has fraudulently disqualified needs no drilled shafts saving up to $500 million. An Immersed Tunnel is supported by the displacement of its weight similar to a floating bridge.

Bob Ortblad MSCE, MBA
Seattle, WA

Interstate BRIDGE Replacement Program

Geotechnical Data Report

Columbia River & North Portland Harbor Bridges

May 2024

Not included in IBR's Draft Supplemental EIS

MALCOLM DRILLING COMPANY PERFORMS
The Columbia River Crossing Test Program

By Alan Rasband, Malcolm Drilling Co., Inc.
and Tait McCutchan, Project Manager

Al Rasband is the Vice President of Malcolm's Northwest Division, Kent, Washington. He currently serves as the Vice President on the ADSC's Board of Directors. (Editor)

Located on Interstate 5 and crossing over the Columbia River connecting the state of Oregon and Washington, the Columbia River Bridge is the last active drawbridge on the U.S. Interstate Freeway system. It is an old and seismically vulnerable bridge that not only serves as the main artery between Portland, Oregon and Vancouver, Washington, but is also the main trucking lane for commerce from the West Coast into Canada. The existing bridge is founded on timber piles in very questionable soils.

As a result of the "necking down" of heavy traffic on the bridge, over 400 crashes occur per year. It is projected that the number of accidents will increase to over 700 by year 2030. Traffic delays of four to six hours occurring daily are common. Delays of freight delivery result in business costs of millions each year. In its current configuration, there are limited transit options to accommodate bus and bicycle traffic.

The plan is to construct a new modern concrete structure that would wrap around the existing bridge and improve the functionality of several closely spaced interchanges. The intent is to dramatically improve traffic flow as well as to provide a right-of-way for light rail transit running from Portland, Oregon, to Vancouver, Washington. The project would also include pedestrian and bicycle access.

Columbia River Bridge illustration.

Due to the location of the project it was necessary to involve several government agencies in the decision process. These included the Washington DOT, Oregon DOT, Federal Highway Administration, City of Portland, City of Vancouver, SW Washington Regional Transportation Council, Metro, C-Tran and "Trimet."

The existing ground conditions posed significant challenges in determining the best method to support the new structure. The riverbed is characterized as having a significant layer of liquefiable materials above catastrophic flood deposits. These lie over the Troutdale Formation which is made up of cemented gravels, cobbles and boulders. This condition required that the depth of the foundations would have to be in excess of 250 feet. As a result, the agencies decided to circulate a special project to perform a test program. The test consisted of the installation of three drilled shafts and one driven pile. This was to be undertaken in order to test capacities and installation methods that had been assumed for the project. The shafts consisted of one 6 foot diameter shaft 120 feet deep; one 8 foot diameter shaft 150 feet deep; and one 10 foot diameter shaft 250 feet deep. The driven pile was 2 feet in diameter, installed to a depth of 130 feet. The 10 foot diameter shaft was specified to include permanent casing to a depth of minus 215 feet. The other shafts called for temporary casing. All three shafts were to be constructed using Osterberg Load Cells, and string gages, and were to be tested using Cross Hole Sonic Logging (CSL) and Thermal Integrity methods. Due to the planned loads and how the 10 foot shaft was to be tested and loaded, it was necessary to use two separate layers of Osterberg Load Cells. The configuration called for one set of five 6,000 kip cells 6.9 feet up from the bottom, and a layer of three 6,000 kip cells 22.9 feet from the top. Installing such extensive instrumentation in a single 250 foot long cage, and allowing for only one splice, presented a significant challenge.

Since the planned project covered an area that boarded two states, and due to the fact that there was a significant distance from beginning to end, two of the test shafts (the 10 foot diameter and the 6 foot diameter) were located on an island on the Oregon side, with the 8 foot diameter shaft located on the Washington side. In that many of the shafts were planned to be constructed over water, the test shaft locations were selected to replicate the conditions expected to be encountered in the river. The project went out for bid in early spring. It was awarded to Max J. Kuney Construction of Spokane, Washington with the drilled shaft specialty subcontractor being ADSC Contractor Member, Malcolm Drilling Co., Inc., (MDCI), headquartered in San Francisco, California. This project was to be managed out of Malcolm's Kent, Washington office. The load test was to be performed by ADSC Associate Member, Loadtest, Inc. The CSL and Integrity testing were to be undertaken by the Washington Department of Transportation.

In May of 2012, the contract was awarded and construction began. MDCI utilized the Oscillator method of construction for the installation of the permanent and temporary casing. The

Cage with testing apparatus.

equipment of several ADSC Associate Members was used for this phase. Included were a Hans Leffer Machine Co. oscillator machine, and Liebherr's 885 and 895 heavy-duty cycle digging cranes for the excavation component.

Casing being installed.

Installation and testing of the 6 foot and 8 foot diameter shafts went without incident. However, during excavation and casing installation of the 10 foot diameter shafts, an unknown layer of very dense boulders in a "fixed condition," resulted in damage to an installation tooth ring to the point that excavation to the planned shaft depth was impossible. Excellent and prompt coordination along with partnering with the General Contractor and WSDOT created an opportunity to arrive at a timely solution. A decision was made that required the shaft to be backfilled with gravel, and the casing removed. The tooth ring was repaired, reinforced, and installation of the shaft

It is interesting to note that the Osterberg Load Cell data indicated that this was one of the largest Osterberg Cell tests ever conducted.

was restarted within just a few days. When the obstruction was once again encountered at depth, great care, along with a combination of tooling techniques were utilized. This allowed the excavation to move past the obstruction advancing the shaft to tip elevation. The shaft was then poured successfully. It is interesting

Oscillator worked well.

to note that the Osterberg Load Cell data indicated that this was one of the largest Osterberg Cell tests ever conducted. This is of particular note as Osterberg Load Tests have been "record breakers" throughout the world for many years.

As a sidebar to this article, it is unfortunate that we report that as of this writing the project has been cancelled due to funding issues. It is hoped that the "cancellation" becomes a "postponement" and that this important project can be taken to completion.

ADSC

On 7/11/2024 2:26:21 PM, WSDOT wrote:

Subject: [Records Center] Public Disclosure Request :: P015465-061324
Body:
RE: Public Disclosure Request of June 13, 2024, Reference #P015465-061324

Dear Bob Ortblad,

In response to your request for records Reference # P015465-061324 dated June 13, 2024, concerning:

Interstate Bridge Replacement
"In November, drilling began under the Columbia River to collect samples to assess soil composition and geologic conditions. This ongoing work is a key step in understanding the state of the riverbed to inform the design and construction of pilings that a replacement bridge will rest upon. Those supports will be the foundation of any new structure, and the geological requirements for their design will provide the program with a reliable picture of what can and can't be safely built. Drilling uses rigs on a floating barge placed parallel to the current bridge about 100 feet to the west. This activity will continue through February 2024 and is not anticipated to cause disruption to residents or river users in the area."

Please send the report and supporting details of IBR's drilling.

We've done a thorough search of agency records; those found responsive to your request have been released to our online Public Disclosure Request Center for download.
Should you have any questions regarding this correspondence, the records received, or you feel additional records should have been provided, please reply through the online portal.
With this correspondence your request for records is considered closed.

Thank you,

Kate Duckett
Public Disclosure Coordinator
Washington State Department of Transportation