



The Alaskan Way Viaduct & Seawall Replacement Project

Retrofit of the Alaskan Way Viaduct: What WSDOT Learned December 2006

Background Information

Several proposals have been made to retrofit the Alaskan Way Viaduct. A specific proposal was made by Victor Gray and the Viaduct Preservation Group in December 2004. A second proposal, slightly different from the earlier version, was submitted by the Viaduct Preservation Group in June 2006. WSDOT hired T.Y. Lin International to conduct an independent review of the proposals to determine if they would meet the earthquake standards used for Washington state bridges.

What did WSDOT learn from the November 2006 T.Y. Lin International report?

In August, T. Y. Lin International found that the proposals to retrofit the viaduct make some improvements, but didn't go far enough to ensure the public is safe when an earthquake hits. A retrofitted viaduct would be damaged beyond repair and may in fact collapse in the event of a strong enough earthquake – one experts predict has a one in ten chance of happening in the next 50 years.

In November, T.Y. Lin International identified the improvement needed for the Viaduct Preservation Group's retrofit proposal to meet the standard for an even more severe earthquake. This earthquake is expected to have a one in 50 chance of occurring in the next 50 years. The applicable standard stipulates that a structure like the viaduct would not collapse in this type of earthquake even though it might suffer serious damage that would require major repair or even full replacement.

Additional improvements needed to the Viaduct Preservation Group's retrofit proposal, in order to meet an accepted standard of seismic risk are:

- The footings of the viaduct require retrofit.
- The lower floor beam / column joints need to be strengthened.
- The joints between the columns and upper floor beams need to be replaced.

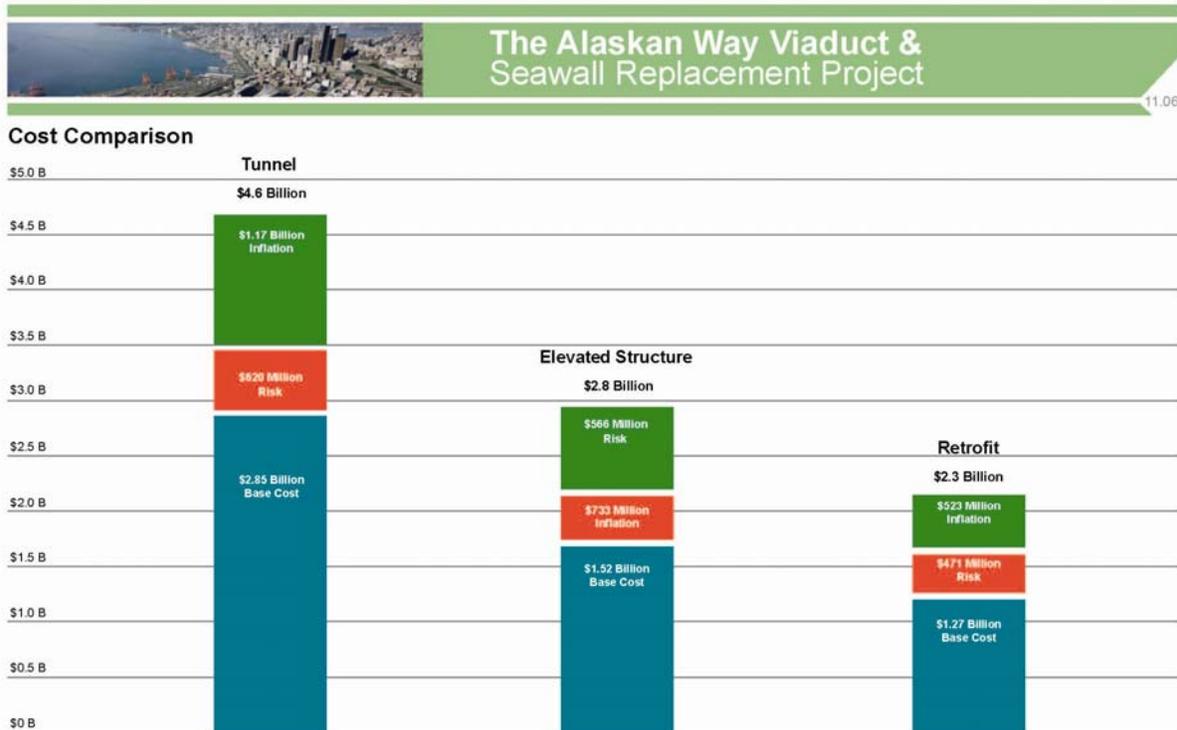
The elevated structure and tunnel alternatives are also being designed to withstand this same standard – an earthquake that has a one in 50 chance of occurring in the next 50 years.

What did WSDOT learn from the cost estimate of the updated retrofit?

The cost of retrofitting a structure to this standard is \$2.3 billion. This full retrofit is more than 80 percent of the cost of replacing the viaduct with a new elevated structure.

This cost estimate is an apples-to-apples comparison of the elevated structure and tunnel cost estimates, which all include inflation and risk. The retrofit, like the elevated structure and tunnel costs, also includes fixing the seawall in the central waterfront.

WSDOT concluded that replacing the viaduct is the most responsible investment of taxpayer dollars.



What did WSDOT learn from the American Society of Civil Engineers review of the Viaduct Preservation Group’s proposal?

WSDOT asked the American Society of Civil Engineers (ASCE) to convene a panel of professional engineers to review T.Y. Lin’s work.

The panel has issued its final report and made several key observations about the Viaduct Preservation Group’s proposal that WSDOT will use to inform the public and decision-makers about the viable options to replace the Alaskan Way Viaduct.

According to ASCE:

- A retrofit of the viaduct must meet a standard of seismic risk for an earthquake of serious severity, likely to have a one in 10 chance of occurring in the next 50 years. In such an earthquake, the viaduct, though it might be damaged, would still be usable after repairs.
- The proposal made by the Viaduct Preservation Group did not go far enough to address the structural, soil liquefaction, and foundation issues that are the key deficiencies leading to the viaduct’s failure in the event of the minimum standard of seismic risks.

- The structural viability of the seawall cannot be considered as a separate issue from the viaduct's condition. The viaduct is dependent upon continued stability of the seawall and the Viaduct Preservation Group's proposal does not address this issue.
- The viaduct today suffers from no shoulders for broken down vehicles to pull out of traffic, narrow lanes; and unsafe rails and decking. The retrofit proposal does not allow for improving driver safety on the viaduct.
- The length of traffic disruptions during construction of a retrofit has been underestimated. There will likely be significantly longer disruptions than suggested by the Viaduct Preservation Group.

In addition, the panel made several observations about the retrofit plan developed by T.Y. Lin.

- Even with a retrofit that meets the minimum seismic standards, the design life of a retrofitted viaduct would only be 25 years.
- The costs of a retrofitted viaduct would be 80 to 85 percent of a full replacement, which leads the panel to conclude that the costs would be higher than the limited benefits gained. This includes the factor that maintenance costs for a retrofitted viaduct will be significantly more than a new structure built to present-day design standards.