

Alaskan Way Viaduct Earthquake Video Simulation

Scope:

PB Project Visualization Group will prepare a video of the depicting the collapse of the Alaskan Way viaduct and Seawall due to a major earthquake. The earthquake ground motions will be characterized by a peak ground acceleration of about 0.25g in an east-west direction and the event will last about 25 seconds. This is sufficient time to generate liquefaction and the associated lateral spreading of the loose fill and Holocene deposit soils along the waterfront . This ground motion has about a 200 year return period. An example of an earthquake that could produce this ground motion at the site includes a deep sub-crustal, magnitude 7 event in the Cascadia Subduction Zone, similar to the historic 1949 Olympia (magnitude 7.1) and 2001 Nisqually (magnitude 6.8) earthquakes. These historic events were located in the portion of the subducted slab beneath Olympia. The magnitude 7 event that would produce the ground motions depicted in the video would be located in the portion of the subducted slab beneath Seattle

In the animated video, the camera will 'fly in' from an aerial view over Elliott Bay to a location near the ground at approximately the uplands of Pier 48 and look north along the viaduct and seawall. Following the fly-in, the camera angle will lock on the viaduct for the duration of the earthquake and collapse of the viaduct before pulling back and up to survey the ultimate damage.

The opening scene just prior to the earthquake will be in the early morning with lights still on in the buildings and cars moving along the viaduct. As the earthquake simulation begins, the viaduct will start shaking and increase to a frequency of approximately 2 seconds with an exaggerated lateral displacement at the top of approximately 4 feet. The traffic will stop and the cars will bump and slide into each other. About 10 seconds from the start of the earthquake, the Seawall will fail with a corresponding lateral and downward movement of the sidewalk and the surface street toward the water. The high pressure gas pipe in Alaskan Way will rupture and fires will erupt in the street and on the piers and adjacent buildings. The steam pipe in Alaskan Way will also rupture with steam erupting in a plume in the street. Next the viaduct will fail beginning with shear fractures in the columns approximately 5 feet off the ground. This will happen at about 15 seconds. A few spans of the Viaduct will crumple as the frames buckle and the beam column connection on one side fails and allows the upper deck to fall down on the lower deck. It will not be a complete "pancake" as it will stay attached on one side. The whole frame will fall toward the piers as the lateral spread of the soil continues beginning at the seawall and moving east. In the final scene, the video will zoom out to an aerial view of the waterfront illustrating the magnitude of the damage to the viaduct and surrounding buildings. The entire viaduct will not be on the ground but several sets of bents. The video will begin and end with text screens with the WSDOT logo and a brief introduction at the beginning and disclaimer at the end.

Schedule:

15% - Storyboard approval by April 30, 2007

50%- Submit animated video for client Review by May 15, 2007

75%- Submit animated video for second client review by May 28, 2007

100%- Submit final video by June 8, 2007

Budget:

It is estimated that a total of 700 hours of labor will be required to produce the requested video. At our average billing rate of \$85/hour, the total cost is estimated at \$59,500.

Direct expenses are estimated less than \$2,000. All labor and expenses will be charged to existing Task Order BE – subtask 7 (Graphic Support). It is assumed sufficient funds remain in this task order to cover estimated charges.

Staff:

Jay Mezher will be in charge of producing the video; Gordon Clark will be responsible for the technical content. Various staff from the Project Visualization Group will assist in creating the video. All production work will be done in Seattle.

Assumptions:

Changes in the assumptions shown below may result in an increased cost, increased schedule or both.

1. The video will be approximately 1 minute long.
2. The shaking of the viaduct will be exaggerated so that the earthquake effect is more evident.
3. There will be 3 over the shoulder reviews; all comments will be gathered at a group meeting.
4. In addition to consultants, reviewers will be limited to the following individuals: Ron Paananen, Alec Williamson, Tom Madden, and Amy Grotefendt.
5. The video will follow the sequence of the approved storyboard.
6. Budget is based on a moderate amount of comments and no major changes in direction or content.

In order to meet the aggressive schedule proposed above we need to begin work immediately. Please acknowledge your agreement with the scope schedule and budget described above or revise as necessary so that we can reach a common understanding of this work and proceed.