

West Seattle Bridge: Fix It!

Re: "How the cracked West Seattle Bridge will push city into debt"

Problems with the West Seattle Bridge are enough to make a Seattle taxpayer's head explode. There is no choice but to repair and/or replace the span at great cost. Options to repair versus replace differ vastly in expense and time to complete with enormous consequences to the Seattle community. The time frame to achieve funding and ultimately complete design and construction of a new bridge could run six to ten years, while repairs to the bridge can be achieved in less than two years and at a price that may be one tenth the cost of a new span.

Presented with only that data, you would be hard pressed to understand why so much time is being spent on a decision that should be so obvious. But of course, there are many other factors to be considered in the cost-benefit analysis, chief among them the expected life of the repair. Should we spend \$100-\$200 million on a repair that would only last a short while or instead spend five to ten times more on a new bridge that could support future light rail. Those are the critical issues in a nutshell.

So far, the public has been privy only to what information has been shared by SDOT, and there's been quite a bit of doom and gloom in those communications about the capability of this bridge to allow for a long-term repair. As a structural engineer and West Seattleite, I've been keenly interested in these bridge cracks. I have performed my own analysis of the bridge using the original structural drawings augmented with input from one of the original bridge engineers who informed me of various contractor-initiated changes to the post-tensioning reinforcement that were made during construction. I have a very different perspective on the feasibility of repair and the viability of restoring the bridge back to useful service. This bridge can be repaired, and it should be, at a cost that will be a small fraction of any replacement schemes that are currently being considered.

Shortcomings in the original bridge design are the cause of the cracks. The primary concern is a lack of reinforcing steel in the sidewalls of the box girders needed to resist shear forces. However, as the consultant team has learned, the as-built condition of the bridge, with reinforcing substitutions made by the original contractor, is better than what was assumed. The city team has determined that the bridge is repairable, a conclusion that was supported by findings of the Community Task Force's Technical Advisory Panel. This is news that should have been accompanied by a collective sigh of relief from everyone.

SDOT appears to be stuck in a narrative that was established back in March, when the city made the correct decision to close the span. At that time, the city's consultant team had only the original design drawings for reference and did not have the benefit of field testing which subsequently confirmed the improved reinforcing conditions. An engineer using only the original drawings might have wondered why the bridge hadn't fallen down already (and why a rigorous study to determine the cause of the crack growth and a program for their repairs wasn't done years ago.)

But as The Dude would say, “new information has come to light, man!” And that new information is GOOD NEWS, though you’d hardly know it by what you hear from SDOT.

For months, SDOT has been pegging the useful life of a bridge repair at 10 years. Last week, SDOT presented the Community Task Force with an updated assessment that a bridge repair might last 15*plus* years. The Seattle Times wrote the repair, “*might last up to 15 years.*” However, a draft version of the presentation that was provided to the committee prior to last week’s meeting showed an expected repair life of 15 to 40 years. As a structural engineer who knows a lot about structural renovations, there should be no reason the repair cannot be designed to extend the life of this bridge out to what it would have been originally, and possibly beyond. If the repair isn’t being designed for that criteria, they’re using the wrong design criteria.

Oh, but more doom and gloom, “what about earthquakes!”

The bridge was constructed in 1984 to design codes using seismic provisions that were less robust than current codes would require. This is also true of almost all of the existing building stock and transportation infrastructure in the city of Seattle. Though the original design was flawed in some regards, there is no reason to believe that the design did not meet the standard of care in terms of seismic performance for its time. We would never consider replacing a vintage 1984 bridge with a new multi-billion dollar structure to hedge against a seismic performance concern. Don’t let all the bad news about the bridge lead you to believe that it must also be an earthquake hazard. It is no more so than many other bridges in our community and is in fact is less vulnerable than many of them.

The “emergency shoring and stabilization” repairs currently underway are more than an effort to keep the bridge from collapsing. They are part and parcel to a program that will bring the bridge back into service. However, SDOT has intentionally throttled back the near-term repairs to the bare minimum “stabilization goal” while the city studies replacement options. Once the public catches on to the fact that replacement of the bridge will cost 10 times that to repair and that a new bridge and will take 3 to 5 times as long to complete, they will wonder why so much time is being wasted vacillating on the decision.

Enough with the doom and gloom. We have a bridge that has a design flaw. Mistakes were made. Let’s fix them with a long-term repair that is feasible and restore this bridge back to service.

Adam Ludwig, Seattle

8/13/2020