

The Cal Stadium Renovation Will Not Make the Stadium Safe

Hank Gehman, Berkeley Daily Planet, 5-31-11

Letter to the editor

The university would have people think that the Cal football stadium renovation will eliminate dangers to public safety in the case of the earthquake and make the stadium and its environs safe for intensive use. This is not true. The renovation of the stadium will not create a risk-free structure and there are other risks that cannot be mitigated by a retrofit.

To mitigate exposure to these risks, the occupancy of the stadium must be kept to the minimum. The CMS should only be used on football game days and the university must abandon its commercial plans to have concerts and other mass events at the stadium.

1. The renovated stadium would remain vulnerable to a serious earthquake

The university claims that the planned renovation of the CMS “addresses 100% of the seismic deficiencies” and so any number of mass events are perfectly safe. This is a false and dangerous claim. The CMS project is an untested, experimental seismic design which adds spaces intended for additional continuous occupancy.

The State Geologist with the California Geological Survey, the State Seismic Commission and the City of Berkeley engineers have reviewed the project and have three areas of concern”

- ◆ The seismic design itself. The State Geologist has strongly criticized the seismic design of the stadium. Writing in 2009 opposing the exemption of the CMS from Alquist-Priolo, “Furthermore, we are unaware of any accepted means of designing structures to accommodate fault displacement... and we are unaware of any published standards to support the proposed concept of designing for surface fault rupture.”
- ◆ The large superstructure for expensive seating and entertainment spaces above the western rim of the stadium. The CGS, the SSC and the City of Berkeley engineers believe this structure risks toppling in an earthquake and adds a significant new danger to the renovated stadium. As a top-heavy structure, it is described as an “upturned pendulum” and would be subject to a “whipping motion.” It is added to the stadium solely for commercial purposes and is bad seismic design. Not only would the people in the structure be at risk, its collapse would threaten either people below in the stadium or, if it fell backwards, would crush people on the roof of the SAHPC (the sole exit path for the western half of the stadium) and block egress from the stadium.
- ◆ The physical expansion of the stadium. The new CMS will add approximately 35% new Gross Square Footage to the existing stadium. This will be primarily for new spaces for new day and night uses (such as a tutoring and study center) and will attract an additional 400 people a day. This year-around continuous occupancy makes it likely that the stadium will be occupied during the earthquake.

2. The stadium is on a very dangerous and complex seismic location.

- ◆ An official group of seismologists predict a 31% chance of a serious earthquake on the Hayward Fault in the next 25 years. The stadium straddles the Hayward Fault which the USGS now predicts can produce an earthquake with a magnitude as large as 7.2 or even 7.5. The lateral shear could be more than 6’ and the vertical uplift 2’. The seismic experience directly at a fault is dramatically different than even close by and is impossible

to reliably predict. The State Geologist writes that fault displacement, "...is less well understood than strong ground shaking."

◆ The geologist, Dr Patrick Williams of UC Berkeley and the LBNL and the university's own expert on the stadium site, concluded in his major study of the adjoining Berkeley Hills that an earthquake at the fault would release seismic energy stored up in the hills that "probably can produce a larger moment-magnitude earthquake than previously estimated."

◆ The USGS has mapped the stadium site as a liquefaction zone.

◆ The stadium is largely built on fill. This can cause an arrhythmic shaking (like a bowl of Jell-O) which can defeat seismic designs. During the Loma Prieta earthquake (70 miles away), Cal football players were knocked to the ground and unable to stand.

It is the height of hubris to ignore the uncertainties of earthquake behavior or discount the possibility that the earthquake will be larger and more powerful than the design is planned for.

3. Landslides.

The USGS maps the hill which the stadium is cut into as a landslide zone. Dr. Williams believes that there is a high likelihood of landslides at the Strawberry Canyon hills in an earthquake. The USGS study of landslides created by the Loma Prieta earthquake showed a strong correlation between ground cracking at the base of hills that produced "larger and more complex" landslides. The Hayward Fault runs exactly at the base of the hill that towers over the stadium. A landslide would cover some or all of the eastern half of the stadium.

4. Crowd panic

Crowd panic is an ever-present danger at any large event at the stadium regardless of whether or not there are structural failures or landslides and could be the most serious safety risk of all. The experience of an earthquake at the stadium will be much more frightening and disorienting than what people experienced at the World Series game in San Francisco during the Loma Prieta earthquake. There will be a deafening sound, extremely violent shaking and a tearing apart of the field. People will not know if there are more quakes to follow but will naturally assume the worst. It is doubtful that people will congregate on the field and wait there (for what?) as the university's plan requires. The predictable response would be to try to be among the first to get through the tunnels and out of the stadium.

The new design of the stadium actually reduces the egress from the stadium. To the west, people must all exit by the SAHPC roof top and then by a stairs to the north. The principle exits at the north and south of the stadium may be blocked by the independent stadium seismic segments after they have moved per design during the earthquake. The east side may be blocked by a landslide. As we have seen in Germany, it doesn't take much to start a panic. It rapidly accelerates and is impossible to stop. Most deaths will be by compressive asphyxiation.

5. No emergency response is likely.

The stadium is compacted into a dense residential neighborhood making access problematic for the stadium and the neighborhood. After the earthquake city rescue services will be overwhelmed. The City of Berkeley doubts that there will be any emergency response at all at the stadium. Holding mass events with little likelihood of public safety response is irresponsible.

Just listing the dangers at the stadium site doesn't guarantee they all will happen. But it is reasonable to expect that one –or all—will occur in an earthquake. A developer may wish to ignore these obvious dangers but public officials must not. The warnings of inadequate egress at the rock concert in Germany were downplayed and ignored. The earthquakes in Japan and New Zealand confounded the experts with their size and violence.

The only way to overcome these risks is to not site stadiums on earthquake faults, or second best, to use them as little as possible.