

April 28, 2021



Supervisor Myrna Melgar, Supervisor Aaron Peskin, Supervisor Dean Preston, Supervisor Hillary Ronen

Via Email

Re: Gas Lines in Soft Story Retrofit Footings
Dear Supervisors,

I am a structural engineer in San Francisco. I and my firm engineered over 100 soft story retrofits under San Francisco's soft story program. I worked extensively with SEAONC's Existing Buildings Committee and DBI's BIC-Structural Subcommittee during the early phases of the program, circa 2015-2017. I was a Director of SEAONC from 2018-2020, and was on the Board and helped our then-President Tim Hart draft a letter that he sent to DBI expressing concerns about QA/QC on for the soft story program. I am also a member of DBI's Board of Examiners, holding the seat of Licensed Structural Engineer - Expert in Seismic Improvements, a position I was nominated for by SEAONC. Suffice to say, I am familiar with the Soft Story Program.

I've seen the recent concerns about gas lines in footings, and want to provide facts and data to help you understand the issue – or, lack thereof as the case may be.

Of primary concern is, are San Franciscans safer from this work, or are we now all going to die from gas explosions instead of collapsed buildings? Unequivocally, this program made buildings safer. So then, are we all going to burn in gas fires? Let's step through how we might get there:

For a gas fire to start, there must be gas leaking from a pipe, and an open flame to ignite it. For a leak to happen the gas pipe must snap. For the gas pipe to snap, the footing must slide or rock so severely that the gas pipe snaps as it wrenches against the adjacent soil.

The Building Code requires engineers to design footings to resist sliding and overturning forces and have a 150% Factor of Safety against movement.

Suppose some engineers failed to do this, and the footings do, in fact, move during an earthquake. Do we have a fire? Not yet, because the gas pipes are supposed to be wrapped in a sleeve to allow for differential movement. In our projects, roughly half had a gas pipe in a footing, and every one of the pipes were wrapped in a sleeve. And every engineer and contractor I've talked with about this issue says the same thing.

Suppose the footing does move, and the pipe bangs against the sleeve or the pipe wasn't sleeved. Is the soil adjacent to the footing so stiff and rigid that it will wrench the gas pipe and snap it? Two-thirds of San Francisco is underlain by sand, and no way is sand going to snap a gas line. The other 1/3 of San Francisco is underlain by a variety of soils, from alluvium to clay to bedrock. Ahh – BEDROCK – that will surely snap a line! Not so fast – the bedrock must be excavated for the pipe to be laid in the ground, and then the trench is backfilled. So even on a bedrock site, the soil around the pipe is pliable.

So we have 1" gas pipes in sleeves, in footings designed to not move, embedded in adjacent soil that is pliable. How might we get a fire?

Suppose somehow that a 1" line snaps. Do we finally have a gas leak? PG&E saw the fires after 1989 earthquake and replaced most pipes with new pipes that have a liner in them to prevent leaks. So, we STILL don't have a gas leak.

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Page: 2
April 28, 2021

What if the LINER fails? Well, we are pretty far down the rabbit hole of small probabilities, but let's continue:

Suppose the footing that is designed to NOT MOVE, moves. Suppose the sleeve that is supposed to be there isn't. Suppose the pliable soil somehow finds a way to crack the pipe, and suppose the liner fails. SO NOW WE HAVE A FIRE!

Wait, where did the flame come from? I cannot imagine any sensible San Franciscan saying, "That was an EARTHQUAKE - let's go outside and have a smoke!" - we all know that there may be gas leaks after a fire, and we know to look for them and to avoid open flames.

Can we guarantee that there will be no fires after an earthquake? Of course not. We can't guarantee anything in life except death and taxes, gravity pointing down and the sun rising in the east. We have pressing issues to deal with in San Francisco, at DBI, and related to Seismic Safety. Gas lines in pipes is simply not one of them.

As for problems at DBI, most of the staff that was reluctant to engage SEAONC in their concerns have left. SEAONC and DBI have a long history of collaborating towards a safer built environment for San Franciscans and new DBI leadership has expressed a desire to continue that collaboration with ongoing and upcoming projects.

When someone says, "we're going to burn from pipes in footings!", please ask, "How, specifically? How *exactly* do we get from a pipe in concrete to another San Bruno?" and to listen carefully to the answer. In the press, I have not seen a single clear path from pipes in footings to fires after earthquakes.

You are entrusted by San Franciscans to lead San Francisco and help tackle issues like Covid, Homelessness, and getting our City back to work and our kids back to school. We have work to do, at City Hall, at DBI, at SEAONC, and throughout San Francisco. Pipes in footings is not an issue worth your precious time.

I've devoted my life and career to helping make San Francisco safer during, and recover faster from earthquakes, and offer my services to that end. Please contact me at any time to discuss or ask questions.

Sincerely and Respectfully,



Randy Collins