Could mass sprinklering of residences be setting us up for more urban firestorm losses in the future?
Design assumptions that have remained constant for generations are no longer reliable in the changing climate. For instance, the assumption has been that interior residential fire sprinklers will be triggered one or a few houses at a time, and therefore water main pressure will be little affected by mass sprinklering. Now, however, the following scenario seems increasingly likely:[1] (1) An urban firestorm burns a large area of a city, such as the 5600 homes lost in Coffey Park (photo above). As these are primarily old houses without sprinklers and with small water laterals constricted by small water meters, only 10–20 gpm of flow leak out through broken plumbing per burned house. That is not too far above the load the mains are already sized for, so there is no indication that sprinklering is a problem—yet. (2) Thousands of homes are rebuilt, most of wood with asphalt roofs, all with interior sprinklers. (3) The city's vulnerability to firestorm is little changed, and firestorm frequency and intensity increases, so eventually the same area burns again. But this time, water leaks at around 10 times the previous rate per burned house, through sprinklers which open when heated and are supplied by large-diameter, unmetered fire lines. The loss of only a few dozen sprinklered houses can depressurize a water main that serves hundreds of houses and several hydrants. Thus, a bow wave of near-zero water pressure could precede the firestorm as it moves across the city, knocking fire defense out at the knees right at the pivotal moment. (It seems unlikely that valves could be shut in the precise places where burned sprinklered homes are bleeding the city out, without collaterally dewatering adjoining unburned areas at their moment of greatest water need.) A successful defense line, where total loss adjoins zero loss (as achieved in Coffey Park; see photo above), would be unlikely to hold. Without water, and with most potential shelters made of fuel, firefighters could do little other than retreat. (4) After two or three sprinkler-exacerbated mega-losses, we may realize that mass sprinklering of combustible homes has *increased* both individual and community vulnerability to urban firestorms, and that this threat is larger than that of structure fires. (It appears that in 2017 firestorm losses were significantly higher than structure fire losses.[2] I predict this ratio will trend upward if we continue the present course.) (5) In the aftermath of this realization, the code's focus may shift from combustible construction with active protection to the more reliable passive protection of building primarily with materials that cannot burn. [3]

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[1] This has not been fact-checked; it would be interesting to model past fires with different assumptions about domestic water supply.

[2] I have submitted an inquiry to Cal Fire to try to pin down this statistic. Preliminary extrapolation from available data indicates more than 2 times the monetary losses to structures from firestorms than from structure fires. Mortality from structure fires is greater, but one big firestorm in which hundreds die would change this in a day. If, as seems likely, the era of urban firestorms is just getting started, we need to be forward-looking.

[3] Though the exact fire rating of the walls is unknown, this is the same material used for millennia in earthen ovens and kilns; 1700°F inside, and you can rest your hand on the outside. The interior walls are the same construction but thinner. Heat moves about 2" per hour through adobe around wood stoves with a 1000°F temperature differential; the exterior walls are 10–20" thick. The roof is entirely noncombustible.