



By Rebecca Quinn, CFM

It's grab bag time again! Every other month I sift through questions I've been asked and my collection of notes for possible topics for this column. Many topics don't warrant an entire column, so I save them up for a grab bag.

**Storage is allowed in enclosures – can we limit what's stored?** The National Flood Insurance Program regulations allow areas below elevated buildings in any flood zone to be enclosed by walls, but only if the enclosures are "usable solely for parking of vehicles, building access or storage." That phrase appears in three places in the regulations: the definition for Lowest Floor; Sec. 60.3(c)(5) – Zone A/AE; and Sec. 60.3(e)(5) – Zone V. The term "limited storage" does not appear in the NFIP regulations, nor is it in the International Codes® or ASCE 24 (standard referenced by the I-Codes).

Some FEMA publications use the term "limited storage," but most don't explain what "limited" means. Two publications suggest limitations, although in sections about accessory structures, which must be limited to parking of vehicles and storage. In effect, the requirements for accessory structures are the same as those applicable to enclosures.

- [Floodplain Management Bulletin: Variances and the NFIP](#) (P-993): "Use of the accessory structure must be restricted to parking of personal vehicles or **limited storage (storage that is incidental to the primary use of the principal structure)**. For instance, the storage in the accessory structure should be limited to items such as **lawn and garden equipment, snow tires and other low-damage items that cannot be conveniently stored** in the principal structure."
- [Technical Bulletin 7: Wet Floodproofing Requirements](#) (TB 7): "Accessory structures, used solely for parking (two-car detached garages or smaller) or **limited storage** (small, low-cost sheds): If a community wishes to allow a non-elevated/non-dry floodproofed accessory structures, the community must establish the meaning of low-cost and small accessory structures. Communities may allow wet floodproofing of these structures provided that they represent a minimal investment and are designed to have a **low damage potential with respect to the structure and contents.**"

#### Limiting Enclosure Size

Some communities specify a size limit for enclosures, typically enough area to park two cars and have a stairway. Limiting size is seen as a way to discourage illegal conversions. But with the rise of "tiny houses" and the "transient lodging" market, even the square footage needed to park two cars may be enough to tempt some people.

Elevated buildings without any enclosure underneath (or that have insect screening, lattice, or louvers) get the best insurance rating, regardless of flood zone.

In Zone V, NFIP flood insurance includes a factor applied when enclosures (with breakaway walls) are smaller than 300 square feet in size, increasing the cost of coverage. And the costs increase more when enclosed areas are larger than 300 square feet in size.

I've seen various state publications similarly describe "limited storage" or storage related to maintenance of the building and grounds, and I've seen publications and ordinances that state storage of hazardous materials is not permitted. But are those limitations really enforceable? There are two aspects to the answer. One is what a community approves, and the other is what an owner does subsequently.

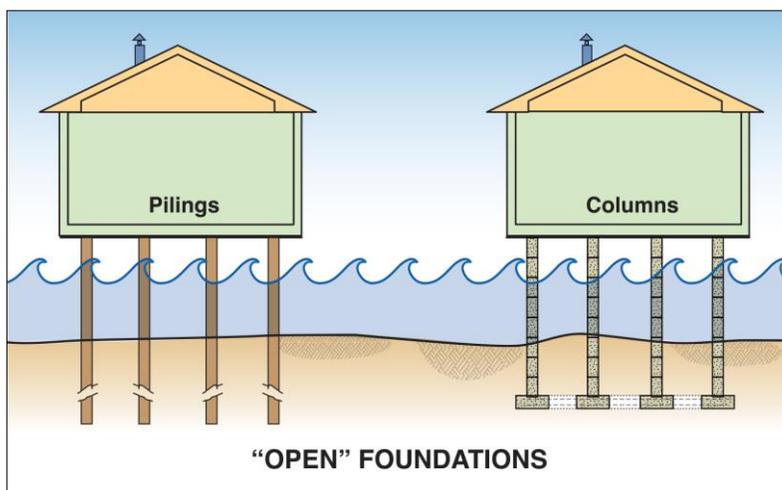
In my opinion, ordinances and codes can be written to regulate enclosure size (sidebar on previous page) and configuration (no partitions). Basic NFIP requirements and FEMA guidance already apply to utilities and equipment (e.g., no stub-outs for plumbing fixtures, only electrical necessary for safety) and all materials below the lowest floor must be flood damage-resistant materials.

All of those things should be checked when plans and drawings are submitted. I always recommend plans showing enclosures below elevated buildings be marked with a statement that "use is limited to parking, storage and building access." And if your community has language permitting "limited" storage or not permitting hazardous materials, by all means add that to the statement on the plans. Even better, if conversion is a significant concern, consider requiring owners to sign non-conversion agreements and record them on property deeds to notify future owners. Communities have a responsibility to ensure proposed plans comply with the requirements and that construction complies with the approved plans.

But what happens after the Certificate of Occupancy is issued? Might owners decide to store a lot of stuff, despite plans noting limitations (maybe valuable stuff that would be destroyed if inundated)? Might owners add partitions? Block off flood openings? Change how an enclosure is used? Of course all those things happen. If push comes to shove, those owners have violated the conditions of permit approval. Whether communities actually have authority to enter and inspect enclosures after permits have been closed varies from state to state. But what is clear is when owners submit applications to modify compliant enclosures in ways that make them noncompliant, communities have the authority to just say no.

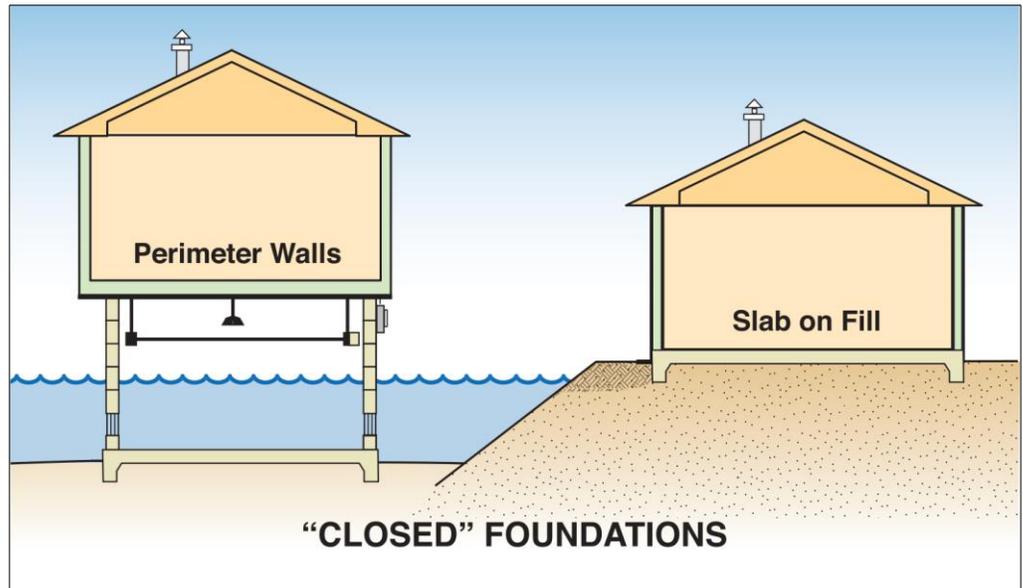
**Why should we pay attention to "open" and "closed" foundations?** Because how they interact with and affect flooding and scour are very different. There are lots of variations in the nature of flood flows. Some riverine waterways have slow rising and slow moving floodwater, while others are flashy, rising quickly and rushing downstream. We regulate buildings to minimize the damage those buildings might experience. An integral, but less recognized reason to regulate SFHAs, is to minimize impacts on floodwaters. What we allow to be built in SFHAs can and often does make flooding worse.

**"Open" foundations** allow floodwater to pass under elevated buildings with minimal obstruction, diversion of currents, and scour around foundation elements. Pilings and columns are open foundations. Shear walls are considered "open" foundations, but only if oriented parallel to the primary direction of flow. While open foundations are required in Zone V/VE, there are plenty of SFHAs designated Zone A/AE where pilings and columns are used. And perhaps, many more where open foundations should be used,



especially in built-up areas where any obstruction to flow may increase damaging conditions. The presence of closed stairwells, elevator shafts and enclosures present some obstruction (in part, resulting in the factor applied for rating NFIP flood insurance, see sidebar on previous page). Breakaway walls are required primarily so that loads on the walls do not damage foundations and elevated buildings, but they also don't obstruct the flow of floodwaters after they fail.

**“Closed” foundations** do not allow floodwater to pass under elevated buildings. Perimeter walls forming crawlspaces, stemwalls (perimeter walls back-filled with earth), monolithic slabs, and dry floodproofed buildings all block and divert floodwater, sometimes causing increased flood levels especially in densely developed areas. Flood openings are required to limit damage due to unequal hydrostatic load – they do not provide sufficient open area to convey



water through a crawlspace. The solid vertical surfaces of closed foundations can exacerbate erosion and scour, especially in Zone A/AE areas with sandy soils. Slab foundations elevated on fill also block and divert floodwater, taking up more conveyance volume than closed foundations because the footprint grows with each added foot of elevation.

**Community Rating System: What's the “real” objective?** In my opinion, the [CRS Coordinator's Manual](#) gets it right. The stated goals are to (1) reduce and avoid flood damage to insurable property; (2) strengthen and support the insurance aspects of the NFIP; and (3) foster comprehensive floodplain management. But what do I hear all the time? “Reduce the cost of NFIP flood insurance policies.” Given the long-term trend of increasing premiums and fees, that's definitely a worthy goal for communities, whether they're already in the CRS, exploring new activities to gain more points or joining for the first time.



I'm in a position to interact with a fair number of local floodplain administrators in my work for Florida state. Whenever I'm asked about modifying ordinances to qualify for points, I'm quick to encourage floodplain administrators to explain to elected officials and the public that the benefits of higher standards include reduction in damage and lower premiums (after all, there is a direct relationship for policies on post-FIRM buildings).

Not that I think that rationale will help resist political pressure to repeal higher standards, which I've also seen recently, typically triggered by an actual flood. The most common ones to get repealed are Cumulative Substantial Improvement and the addition of repetitive loss language on the definition for Substantial Damage (so that flood-related damage on two separate occasions during a 10-year period, for which the cost of repairs equals or exceeds 25% of the market value of the building is Substantial Damage). The most common reason? "We don't want to adversely impact our affordable housing."



## Substantial Improvement/ Substantial Damage Desk Reference

FEMA P-758 / May 2010



I'll bet you're not surprised that I pitch the merits of declaring Substantial Damage in order to bring non-conforming buildings into compliance and the long-term benefits of lower NFIP flood insurance premiums, year after year. But what also comes to mind is this: when communities contemplate cumulative Substantial Improvement or repetitive loss, they really should play out various scenarios before adoption. Some guidance is available in the [SI/SD Desk Reference](#) (FEMA P-758).

**Submit your own items or suggestions for future topics to column editor Rebecca Quinn, CFM, at [rcquinn@earthlink.net](mailto:rcquinn@earthlink.net). Comments welcomed!**

## Digital Coast Partnership Hosts Congressional Briefing

ASFPM co-hosted (as part of the [Digital Coast Partnership](#)) a Sept. 21 congressional briefing on disaster preparedness that focused on using [Digital Coast tools](#). "Interestingly, this has been in the works before Hurricanes Harvey and Irma, so it represents a well-timed opportunity to discuss science-informed approaches to resilience and recovery," said ASFPM Executive Director **Chad Berginnis**.



*L-R: ASFPM Washington Liaison **Merrie Inderfurth**; **Jeff Lovin** of Woolpert and MAPPs; **Bradley Watson** of Coastal States Organization; ASFPM Executive Director **Chad Berginnis**; **Jeff Stone** with ASFPM's Flood Science Center; NOAA's Science and Tech Services Division Chief **Nicholas Schmidt**; and **Allison Hardin**, a planner with the city of Myrtle Beach, South Carolina.*