Q&A

Is It Necessary to Compact Slab Sub-Base?

Q. *We need to pour a 24x24-foot concrete slab for an attached garage next to a precast foundation. The precast walls are 9 feet and 4 feet tall (see photo). Unfortunately, the trench overdig is 7 feet deep and as much as 4 feet wide in some places. We would prefer to avoid backfilling and tamping such a huge void. Is there another more cost-effective option?*

A. *Jay Meunier, a contracting specialist at S.T. Griswold and Co., a ready-mix supplier in Williston, Vt., responds:* We have seen too many garage slabs fail due to improper backfill and compaction. This applies to the overdig area as well as the raised sub-base underneath the slab. Each time a vehicle pulls into a garage and stops, that action creates a plate compactor effect. If the backfill under the slab has not been properly compacted, the structural fill will eventually settle, leaving voids. Since a slab-on-grade is not meant to be structural — supporting its own weight plus any imposed loads — the slab will certainly crack if the voids are large enough.

You are right to be concerned about the void created by the foundation overdig, which appears to extend under an adjacent living space supported by a 4-foot precast wall. You'll need to block off that extension of the overdig before backfilling; otherwise, the backfill material will migrate from under the slab into this sizable hole, leaving an unsupported void. Build a small containment wall with masonry block, concrete rip-rap, or a similar permanent material.

Once that area is blocked off, use a clean structural fill such as crushed stone or gravel. If you use stone, you can typically avoid compacting in place, as it is considered a self-compacting material. If you use gravel, you will need to compact in lifts of 8 to 12 inches.

An alternative is to use a cementitious product such as flowable fill. Flowable fill is more expensive per cubic yard than structural fill (stone or gravel) but provides several advantages. It can be placed directly from a ready-mix truck, it requires no compaction and little labor, and its strength can be adjusted downward so it can be excavated later on if changes are made to the house.

If you spend the time and money to properly prepare the backfill and sub-base, you'll prevent slab failure later.

Placing Wall Receptacles

Q. *An old house I'm working on has too few wall outlets to meet code. What are the rules for spacing and positioning of new outlets? Can I place them in the baseboard trim? And do some of them also have to be switch controlled?*

A. *Master Electrician Rex Cauldwell responds:* Most old houses have too few receptacles to meet current code requirements. Any wall section 2 feet wide or wider requires a receptacle, and every point along any wall must be within 6 feet of a receptacle. Doors and fireplaces don't count as part of the wall, but fixed-glass panels (like the nonsliding half of a glass slider) do. So starting at a door frame or corner, you must place a receptacle within 6 feet, and one at least every 12 feet thereafter.

Receptacles dedicated to one specific appliance, floor receptacles more than 18 inches away from the wall, and receptacles more than 5 1/2 feet from the floor do not count as required receptacles.

This is code minimum. For a premium job, I suggest going beyond code and adding one receptacle on each wall within 3 feet of a room corner, one on each side of any window 3 feet wide or wider, and one on each side of the bed (assuming the bed never moves).

Receptacle height is not specified as long as you don't exceed 5 1/2 feet from the floor. Receptacles can be installed above that height, but they are not counted as part of the required minimum.

And yes, receptacle outlets can be placed in the wood trim. I do this quite often in log cabins and renovations. However, be careful if you try to remove outlets from or place them in antique wood trim — the wood is easy to damage and hard to replace.

No receptacle is required to be switch controlled. However, you are required to have switched lighting in most habitable rooms. This is usually done with an overhead light in the ceiling, but a floor lamp plugged into a switched receptacle also satisfies the requirement.

Ice Buildup Problem

Q. *We built a custom home for a client in west Michigan a couple of years ago, and the home has had problems with ice ever since. It's a 1,450-square-foot ranch with cathedral ceilings and many can lights throughout. We used blown fiber-*

glass insulation in the ceiling assemblies. From the beginning, the can lights (IC-rated) overheated and tripped their thermal-protection breakers. We finally resorted to pulling the insulation away from the housing of the can lights so they TAs a result, the heat from these lights now warms up the roof and has created a horrible ice problem instead. Last fall we even added four pot vents to the back of the roof in addition to the soffit-to-ridge venting. The homeowner called to report that the pot vents have improved the situation but not completely. I drive by this home frequently and see ice buildup there while other homes in the area are ice free.

A. *Editor Don Jackson responds:* The fact that the home your company built is the only one in the neighborhood with ice problems is not going to help your reputation as a quality builder. Adding pot vents to the roof is tantamount to heating the outdoors in an effort to cool the can lights.

Since you seem to be able to reach the can lights from an adjoining attic area, you might be able to place a sealed, insulated box around each can, but there's a chance the overheating problem would come back.

Instead, line up your electrician and drywall finisher. Pull the cans and convert them to track lighting or some other kind of surface-mounted fixtures, then seal up and patch the ceiling, making sure you plug all the holes. Carefully replace the insulation and get rid of the pots, and your problem should disappear. In the future, avoid can lights in cathedral ceilings.

Housewrap in Hot, Humid Climates

Q. *I'm in discussions with an architect regarding the pros and cons of using Grace Ice and Water Shield or a similar membrane material as a housewrap. These materials are more expensive than Tyvek or 15# felt but can't be beat when it comes to the wind-driven rain we get here in the Florida Panhandle. My architect has cited Paul Fisette's articles on felt, housewraps, and flashings as his reason for requiring felt ("Making Walls Watertight," 12/95; "Housewrap vs. Felt," 11/98). But Paul Fisette works in a "heating" climate, not a "cooling" climate like ours. Would he recommend different details for a hot, humid climate?*

A. *Corresponding editor Paul Fisette replies:* Your observation is correct: Climate has an impact on the specification of a weather barrier system. I would not recommend using a membrane like Grace's rubberized product over wall sheathing in a heating climate. It is impermeable, and it forms a powerful cold-side vapor barrier. If water or vapor leaks into a wall cavity that has a tight "rubberized" covering on the exterior cold surface and an impermeable vapor retarder installed on the warm interior surface of the wall, it will be trapped there.

But in your hot, humid climate, a low-perm membrane applied facing the warm exterior could work. It is important to build the wall so that it's able to dry toward the inside when conditions dictate — in other words, don't apply a poly vapor barrier or vinyl wallpaper to the interior.

However, given the expense of rubberized membranes, I think I would choose 30# felt. It's stiff and a bit difficult to work with, but it's more forgiving if you get water on the wrong side of the membrane. If you are building in a very exposed location where "sideways" rain is common, I would consider a rain screen design, which balances air pressure and creates a drainage plane. This option is not cheap, but I think it's more effective for severe exposures.

Got a question?

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