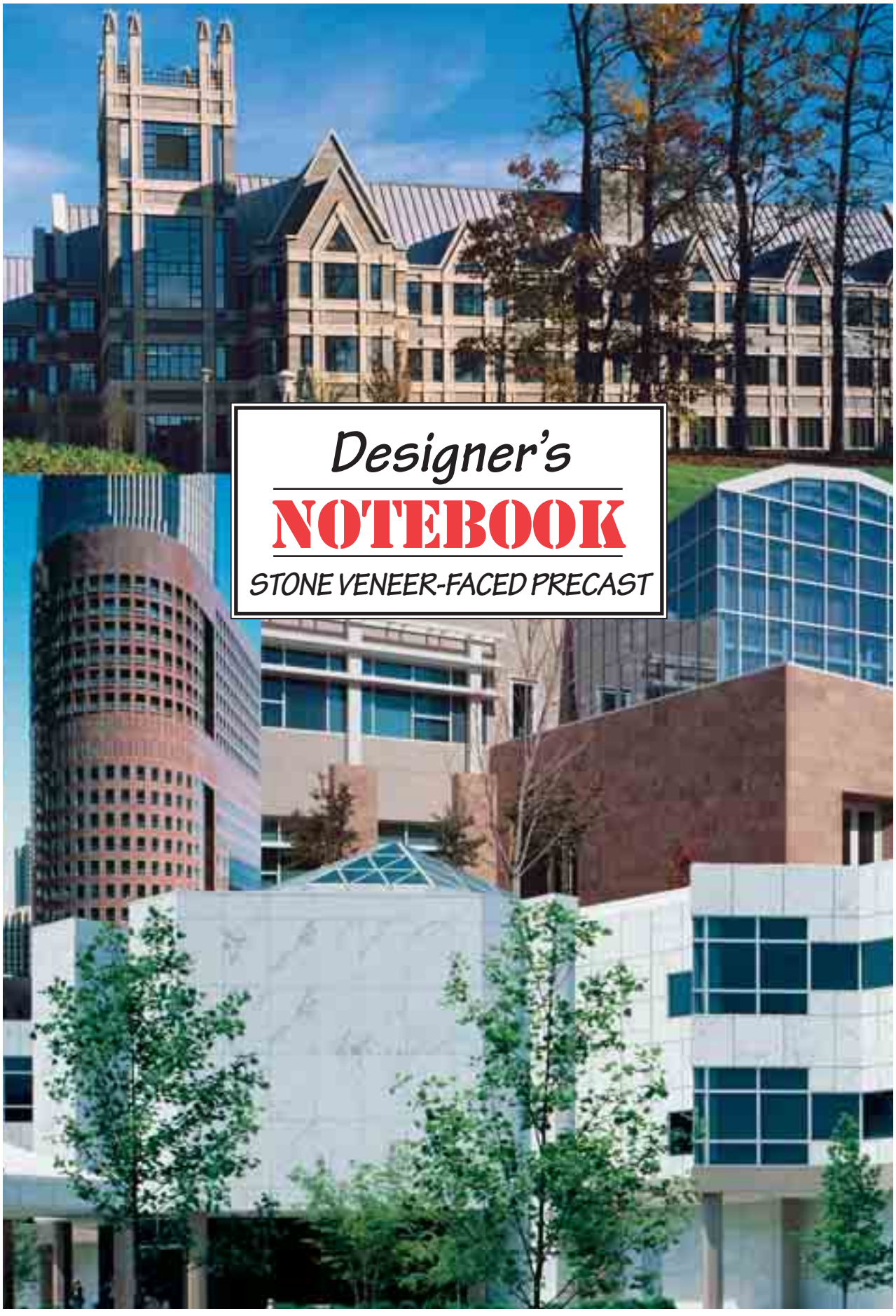

Designer's NOTEBOOK

STONE VENEER-FACED PRECAST

Stone Veneer-Faced Precast Offers Cost Efficiencies — Article VIII (continued from last issue)

PCI's Architectural Precast Concrete Services Committee highlights how precast can achieve the same goals as stone façades

The bondbreaker between the stone veneer and concrete backup may function as a vapor barrier on the concrete's exterior face, keeping moisture in the veneer or at the interface, unless drainage provisions are provided. After some time, gaps also may develop between the stone veneer and concrete backup at the bondbreaker. These gaps could allow moisture penetration due to capillary and gravity action, particularly where the window or roof design allows water to puddle on top of the panel. One solution is to apply a sealant to the top and side edges of the stone/concrete interface after the panels are cast. Care must be taken to ensure that the sealant used is compatible with the sealant to be applied to panel joints after erection of the panels.

German limestone is anchored to precast panels on the Terry Sanford Institute of Public Policy at Duke University in Durham, N.C. (Architect: Architectural Resources Cambridge Inc.)

Panel Watertightness

The bondbreaker should not be sealed at the bottom of the panel. This ensures any moisture that somehow penetrates the stone veneer can drain freely. In the case of long panels, a sloping gutter is sometimes used not only under the window but also at every horizontal joint.

Veneer Jointing

Joints between veneer pieces on a precast panel are typically a minimum of 1/4 inch, although they have been specified equal to the joint width between precast elements, usually 1/2, 3/4 or 1 inch, depending on the panel size. As actual joint width between precast panels (as erected) depends largely on the accuracy of the main supporting structure, it is not realistic to require matching joint widths between stone pieces and between panels.

Often, an invisible joint is specified, e.g., less than 3/16 inch, especially on polished veneer. This simply is not possible because the joint must have the width necessary to allow for movements, tolerances, etc. Also, due to tolerances and natural warping, adjacent panels may not be completely flush at the joint, and shadow lines will appear. Rather than attempting to hide the joint, it should be emphasized by finding an aesthetically pleasing joint pattern with a complementary joint size.

When stone veneer is used as an accent or feature strip on precast concrete panels, a 1/2-inch

Polished granite feature strips on Shriners Hospital for Children, Sacramento, Calif. (Architect: Odell Associates, Charlotte, N.C. and Associate Architect: HDR, Omaha, Neb.)

space is left between the edge of the stone and the precast concrete to allow for differential movements of the materials. This space is then caulked as if it were a conventional joint.

Caulking between stones or panels should be an elastomeric, usually urethane, polysulfide or silicone, which won't stain the stone-veneer material. Some grades of silicone sealants are not recommended by their manufacturers for application on stone, as they may stain light-colored stones. In some projects, caulking between stone pieces on a panel may be installed more economically and satisfactorily at the same time as the caulking between precast elements. On other projects, consideration may be given to caulking the veneer material at the plant. Plant caulking of stone-to-stone joints is recommended in areas subject to freezing and thawing, if panels will be left in prolonged storage during winter months.

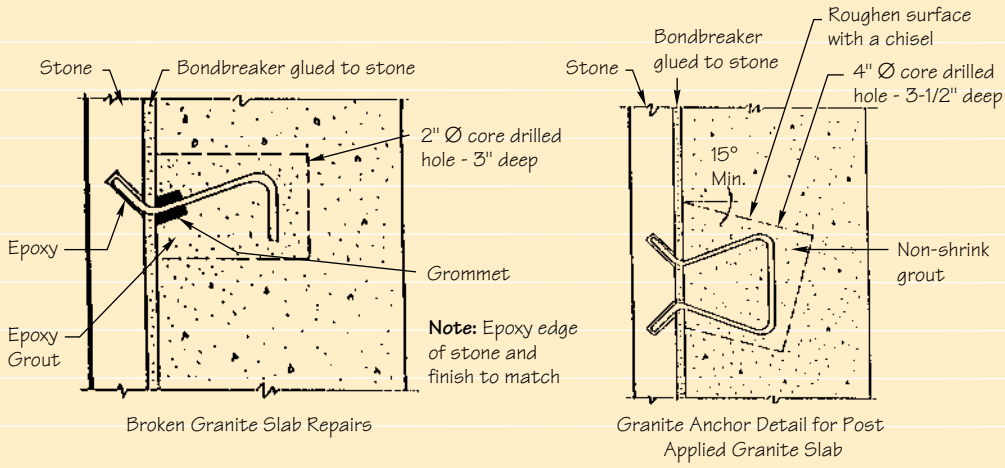

Fig. 8 Repairs where rear access is not possible.

Repair

Should minor damage occur to the veneer stone during shipping, handling or erection, field remedial work can be performed successfully. The precaster normally does such repairs, with repair procedures developed in consultation with the stone fabricator. (See Fig. 8)

Epoxy, stone dust and a coloring agent, if necessary, are used to repair small chips or spalls. These patches can be finished to the same surface texture as the stone facing. If it is necessary to replace a stone piece, satisfactory techniques have been developed for when the back of the panels is accessible or after the panels have been erected and the back of the panels is inaccessible.

The Beauty Of Stone Meets The Ease Of Precast

Jim Rothwell, principal with Callison Architecture Inc., explains a cost-effective way to apply stone to buildings in today's construction market

Over the course of designing millions of square feet of buildings, we have dealt with many exterior materials and methods of installation. In recent years, we have found that stone applied to precast is a cost- and schedule-effective solution.

Building with stone is a choice made for a variety of mostly aesthetic reasons—contextual, historical, image, surface variation and durability. However, in today's construction market, building with solid stone is not economical. As an option to solid stone block, architects wanting to achieve the aesthetic or functionality that stone offers can use stone veneer.

There are three primary options for installing stone veneer: on studs, on steel strongback or on precast. All offer a more cost-effective solution than solid stone. Because the backs aren't visible in the final product, the choice of backing for the stone veneer is not an aesthetic one but one of function, economy and schedule.

The Wellpoint Executive Center in Thousand Oaks, Calif., combines natural sandstone veneer-faced panels and precast to create a strong horizontal rhythm that blends into the hilltop.

Stone On Precast Systems

The primary reasons we have chosen to use stone veneer on precast have been based on several factors. These include compatibility with surrounding materials, the structural system or the construction method. If a building is constructed of precast concrete, then it is obvious that you would put the stone on precast backing, too. If it is brick or some other system, the decision to use stone on precast may be based on factors such as labor, close proximity to a precast plant or weather conditions.

For 1700 Seventh Avenue, a 525,000-square-foot Class A office building with ground-level retail in downtown Seattle, we wanted the design to have an understated, timeless quality appropriate to its surroundings. While the façade is primarily precast concrete, the base of the building features a natural, matte granite that is historically appropriate for that part of town. It also is durable and resistant to weather and vandalism.

The precast panels used in Wellpoint's Executive Center were custom-matched in both color and texture to the stone veneer.

Of the installation choices—hand set, stone on steel strongback system and stone on precast—we selected stone on precast for two reasons. First, it was the most cost effective. Second, it offered ease of coordination with the other precast components it touches, providing a good method to get a true secondary-seal weather joint, an important consideration with Seattle's rainy weather.

The stone-on-precast system here gives us a primary and secondary seal—a primary seal at the base of the panel and the secondary seal at the back of the panel. This creates an air chamber between the two seals that helps drop water out of the building as opposed to pushing it through the building with pressure. In addition, if the stone has porosity, the precast provides another layer of material for water protection.

Another advantage of stone on precast is quality and schedule control. Any components that can be manufactured in a precast plant in a controlled environment, using established quality standards, offer a better chance of maintaining quality. Since it also offers a panelized system, incorporating the stone into the panels eliminates a step.

Combining Cast And Field-Set Stone

For a retail building under construction in downtown Chicago, we used a combination of stone cast into the precast panels and field-set stone. The building features precast construction with glass curtain wall, with the stone detail supplying richness of texture and color. Working in a climate with freeze-thaw conditions, panels prefabricated with the stone in place solves many of the problems of working in cold weather.

Stone veneer at the base of the 1700 Seventh Ave. building in Seattle adds an appropriate contextual detail.

Because of weatherproofing conditions at the base of the building, a cast-in-place foundation was used below the sidewalk. In this case, field-set black stone at the base acts as a cover plate to conceal the joint of foundation and precast panels. For

Faced with snowy conditions on Chicago streets, this department store uses a dark granite veneer base to provide a durable, easily maintained surface.

the rest of the building, stone veneer was used as window surrounds and medallion details of a feature stone higher up, applied one per panel. While these could have been either field-set or prefabricated, it was much easier to cast them in the plant.

Wellpoint Executive Center is an 88,000-square-foot, two-story building housing the executive offices for this Fortune 500 health services corporation. In contrast to the pink stucco structures common to the area, the new executive center was designed to blend harmoniously into the stony Southern California hilltop.

Located on the last "buildable" hilltop in Thousand Oaks, the design uses two materials—sandstone and precast—to create a strong horizontal rhythm. But it changes slightly as it moves up to the predominantly precast second story. The contrast of the materials breaks down the mass of the long, low façade, so when it is viewed from a distance, the building becomes an extension of the landscape.

It was neither aesthetically nor economically suitable to build the entire façade of stone. Therefore, the design combines natural stone veneer panels with richly colored and textured precast panels to create a modern yet timeless building well grounded on its site. In addition to wanting to emphasize the aesthetic strengths of stone veneer, the company also needed to minimize costs without sacrificing design integrity. Using an innovative assembly technique, the precast contractor not only fabricated the precast panels but also mounted smaller stone panels to precast panels to form a larger, stone-faced precast unit. This resulted in a more cost- and time-effective construction solution and a highly integrated building enclosure.

This detail view shows stone veneer on precast that was used as a window surround.

After extensive research, the designers found a contextually compatible, warm buff-colored sandstone. The precast panels were custom-matched to the natural sandstone in both color and texture. Further research resulted in the choice of a warm-colored matrix and an aggregate of yellows, tans, creams and some black that picks up the variegated colors of the stone, as well as the surrounding landscape. Also, the addition of aggregate to the concrete and a medium sandblasted finish balance the precast to the stone in texture.

As these examples indicate, stone veneer provides a striking façade treatment that meets the tight restraints of today's budgets and timetables. Blending stone and precast offers a strong choice that designers should consider whenever they are looking for ways to create this type of look and to do it in a way that is both time-saving and cost-effective.

—Jim Rothwell, AIA, principal, Callison Architecture Inc., Seattle