



Lightweight Solutions to Current Problems

by John A. D'Annunzio

Environmental regulations are changing the way that building components will be designed and constructed throughout the 21st century.

For example, wood blocking has long been used as an anchoring substrate for metal edge and flashing components, such as expansion joints, curbs and accessories. Traditional wood blocking consists of pressure-treated lumber to prevent against wood rot, insects and deterioration from moisture. In January 2004, federal regulators halted production of lumber that was treated with arsenic as a preservative. The EPA has classified the arsenic used in the pressure treatment process—chromated copper arsenate (CCA)—as a potential cancer risk. EPA studies concluded that CCA was linked to bladder, liver and lung cancer. It has been estimated that CCA was used on approximately 90 percent of all pressure-treated lumber in the United States.

Although federal regulators have allowed a phasing out period of CCA for nearly two years, most lumber treated in the United States still used CCA until recently. This was partially due to the fact that viable preservative alternatives were not readily available. The lumber producers are currently using two newer additives: alkaline copper quat and acid copper chromate. Both of these products have little track record. Wood blocking is typically installed at the roof edge, the juncture that is most susceptible to wind uplift failures and moisture infiltration. Failures at this could potentially weaken the roof.

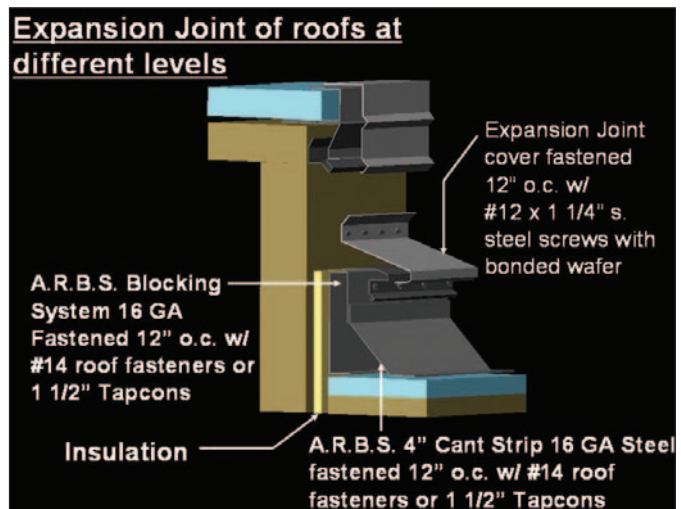
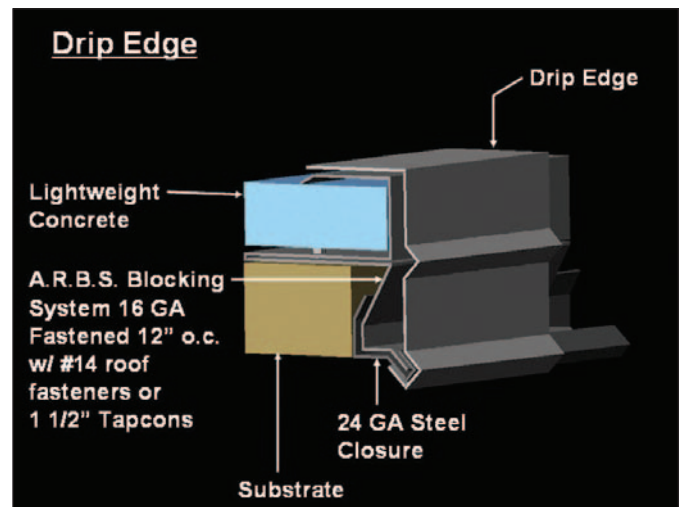
A Sustainable System Solution

A roof system developed in the '90s counteracts the current problems with wood blocking, meets challenges brought on by labor shortages and depletion of natural resources, and provides long-term waterproofing protection. The system is also environmentally friendly and Energy Star-approved.

The system design incorporates lightweight concrete poured over EPS insulation; alternative blocking manufactured from galvanized steel, steel, aluminum or plastic; a multi-ply SBS-modified bitumen membrane; and reflective coating.

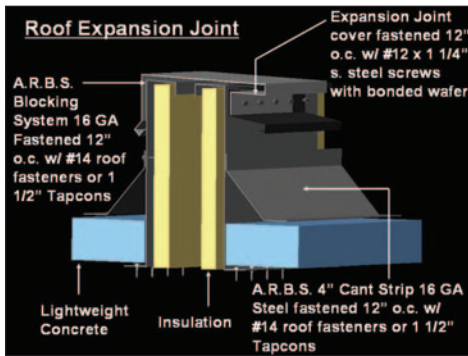
Part Lightweight

There are several benefits to the use of lightweight con-



crete on current roof applications. When provided with insulation—as in this system—a thermal R-value as high as R-30 can be easily achieved without insulation delamination or warping. The lightweight concrete also provides a sound substrate for membrane application and it can be formed to achieve proper slope without tapered insulation.

In addition, lightweight concrete provides the building owner with long-term cost savings. Since the lightweight construction becomes part of the structure, replacement is



ucts can be applied directly to this system.

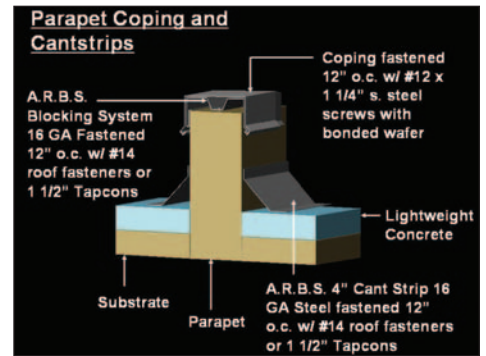
Another major advantage of the system is the wind uplift capacity that it provides at the roof's most vulnerable point: the roof edge. The metal edge material is specifically designed to meet wind uplift pullout and pullover tests. The proper fastening pattern is ensured through the placement of pre-fabricated holes in the manufacturing

process. The contractor simply secures fasteners at each opening. Fastener corrosion, common in wood blocking applications when non-hot dipped fasteners are used, is not a concern.

Since the blocking system is designed to the slope of the lightweight concrete, the same size fastener is used throughout the project. This eliminates the use of incorrect fastener lengths that do not adequately secure the blocking to the structural substrate, eliminating the potential for fastener back-out. In increased slope applications, wood blocking is sometimes stacked up to three to four boards in height. This necessitates longer fasteners and has the potential for unstable edge substrates. Metal-to-metal components experience less expansion and contraction from differential movement than wood-to-metal adjoinments.

Finally, metal blocking is less expensive per lineal foot than lumber and since the cleat is built into the blocking system, application of edge metal and coping is seamless and less labor intensive. The blocking system can be formed on-site allowing the contractor to have the material shipped in coils to the job site. This eliminates the need for contractors to turn their job sites or shops into lumberyards for each project.

The A.R.B.S. assembly has been successfully applied in demanding conditions on several projects in Florida, meeting the most stringent wind uplift requirements in the country. Projects include the Dade County Schools, Broward County Schools, Palm Beach County Schools and the Miami Beach Convention Center.



Plus a Durable Membrane

A two-ply SBS-modified bitumen is a perfect complement for this system. Among the many advantages of SBS is that it can be used in virtually any type of condition and provides the contractor with four attachment methods: torch applied, set in hot bitumen, applied in cold adhesive, or self-adhered. The application methods can be separate for each modified layer. Best results have occurred with self-adhered sheets set over the lightweight and an alternate attachment used on the cap sheet.

SBS-modified bitumens are proven 20-year roof systems. Another advantage is that at the end of the membrane's service life, an additional cap sheet can be applied once all required repairs are done on the existing membrane, and the system can provide an additional 10 to 15 years of waterproofing protection. This complements the fact that the lightweight does not need to be replaced at the end of the membrane's service life, again saving space in landfills. The system can also meet Energy Star requirements if a properly formulated reflective coating is applied over the cap sheet. Industry research indicates that SBS sheets provide longer service lives if they are coated to protect from ultraviolet radiation within the first five years of application. **R**

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not required during remedial roof applications as is the case with insulation. Rather, only the membrane removal is required. This frees space in landfills and substantially cuts the costs of tear-off operations, which can be as high as 50 percent of the total project costs.

Lightweight concrete does have some limitations. The system is installed on-site and a successful application depends on the skill of the installing contractor. Also, repairs to improperly applied lightweight could be costly. The installing contractor must pay attention to the temperature constraints relating to proper moisture cure of the concrete and restrictions of ambient temperatures.

Add Blocking

Another advantage is an alternative roof blocking system (or A.R.B.S., developed by Henry Gembala), which is composed of one or more pre-formed component structures fabricated from a non-corrosive, durable material. The blocking is secured to the lightweight concrete and is properly formed to the slope of the concrete. Pre-fabricated vent holes at the intermediate portion of the blocking enable venting of gases and moisture that may accumulate in the roof system, thereby reducing the likelihood of premature roof failure.

In addition to the environmental advantages, since the products are fully recyclable, A.R.B.S. has excellent fire-resistance capacity as well. The products are non-combustible and there is no threat of accelerated fire spread that could occur with traditional wood blocking. Torch-applied prod-