REMR TECHNICAL NOTE CS-MR-7.4

Selection of Concrete Exterior Wall coatings

Purpose

To identify elements of exterior wall coatings that promote resistance to damage from sunlight, moisture, and changing temperatures.

Characteristics

There are five characteristics that exterior wall coatings should have in order to be impervious to outdoor elements. These are breathability, resistance to wind-driven rain, ultraviolet (UV) stability, flexibility, and resistance to alkali and fungi.

a. Breathability. Some exterior coatings literally trap water vapor that normally moves in and out of the concrete as temperatures and humidity change. When this happens, the coatings may lose their bond with the concrete and may even encourage damage from cycles of freezing and thawing. The permeance rating of water vapor for a coating can be obtained from the manufacturer and should be greater than 3, measured in accordance with ASTM E96.

b. *Resistance to wind-driven rain.* Carbon compounds, soot, and acidic components may be present in rain. These elements can result in discoloration or deterioration of concrete. Therefore, exterior coatings should be able to withstand penetration by wind-driven rain. Federal Specification TTC 0055B can be used to measure the ability of a coating to resist this type of penetration.

c. *UV stability*. Some polymers are adversely affected by UV rays in sunlight, which can cause fading, brittleness, or even loss of physical and chemical properties. Ability to withstand 1,000 hours of UV exposure is desirable in an exterior coating. To check the resistance of a polymer to UV light, refer to ASTM D822.

d. *Flexibility*. Concrete structures change in volume with the rise and fall of temperatures. This change is due to the flow of water vapor in and out of the concrete. It is necessary for exterior coatings to also expand and contract with these concrete surfaces and to provide limited crack-bridging to extend the life of the structure. ASTM D522 provides comparisons of the elongation of different coatings.

e. *Resistance to alkali and fungi*. Through time, soluble salts may migrate to the surface of concrete and may cause failure of exterior coats to bond to the concrete. In addition, fungi growing on damp concrete may create problems such as discoloration. Incorporation of fungicides and/or biocides will aid in prevention of these problems. Check with ASTM D3273 to obtain the rating of a given exterior coating to resist fungi growth. The rates range from 0 to 10; the lower the value, the better.

Reference

Cadsawan, Nonn. (1993 June/July). "Weathering the storm," *Concrete Repair Digest*, p 119.