Microstructural differences and related surface durability of exterior concrete slabs as a result of finishing techniques and timing

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ABSTRACT:
The surface durability of exterior concrete slabs is highly dependent on proper finishing techniques. Premature deterioration of flatwork has become an increasing issue with the use of aggressive deicing salts on sidewalks, parking slabs and roadways. Proper placing, finishing and curing are essential for a concrete paste to withstand these chemicals and the harsh winters they accompany. It is generally well known that premature and late finishing of flatwork can result in premature deterioration and surface defects. This paper will investigate and compare the microstructural characteristics of slabs finished early, and late, with those finished at the proper time using techniques as outlined and defined by the American Concrete Institute Concrete Flatwork Finisher Certification. The microstructure of a properly timed finish with and without a curing agent applied will also be investigated to establish the effects of proper curing. Abrasion tests were performed to correlate abrasion resistance, as a measure of surface durability, with the paste microstructural characteristics.