VCAS Architectural Precast Concrete
– Plant Trial Summary Report –

Scope: This report presents concrete testing data for samples prepared during a plant trial of VCAS White Pozzolan produced by Vitro Minerals Inc. at an architectural precast facility in western New York State. The samples were prepared from two full-scale production batches at the plant: a "Control" batch using a 50:50 blend of white and grey Portland cement, and a "VCAS" batch in which 20% of the cement was replaced with VCAS Pozzolan. Cylinder, prism and block samples were prepared from each batch, and plant personnel also cast typical precast architectural elements from each batch. A single element from each batch was taken to AMEC's Hamilton laboratory (see photograph next page) and stored outdoors exposed to weather, with samples recovered by coring at 6 months age for additional testing.

Results: The following table summarizes the testing conducted and observation of the concrete batches:

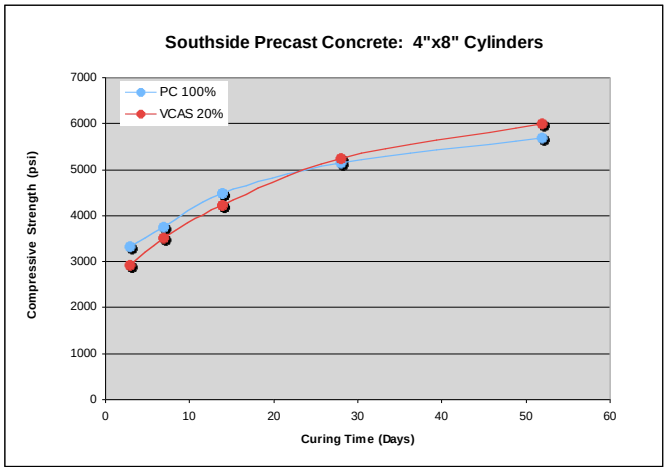
Customer/Facility:	Name withheld
Date:	July, 2007
Mix Design: **Goal:**	Nominal 5,000+ psi concrete for architectural elements Replacement of 20% cement with VCAS-8
Workability:	No effect on spread; VCAS concrete more cohesive
Air content (5-6%):	VCAS had no effect on plastic and hardened concrete; good air void spacing
Compressive Strength:	VCAS: 28d = 5,228 psi (102% of control); 56d = 5,975 psi (105% of control)
Modulus of Elasticity:	VCAS: 28d = 106% of control; 56d = 123% of control
Rapid Chloride Permeability:	Control = high; VCAS = very low (>90% reduction)
Salt Scaling Resistance:	50 cycles, Pass; VCAS: mass loss well below the 0.80 kg/m^3 value required
Efflorescence:	Improved color fastness, ongoing
Sulfate Resistance:	Under test

The results for unconfined compressive strength (UCS) and modulus of elasticity (MoE) testing of 4"x8" cylinders are provided below, together with a graph showing the compressive strength development for the two mixes. The VCAS concrete mixes show improved performance relative to the control at 28 days and beyond.

Age (Days)	Strength (psi) Control	80:20 VCAS	%
3	3306	2915	88
7	3727	3495	94
14	4467	4221	94
28	5133	5228	102
52	5670	5975	105

Modulus of Elasticity (ASTM C469)

Age (Days)	Modulus of Elasticity (psi*10^6) Control	80:20 VCAS	%
28	3.8	4.0	106
52	4.0	4.9	123



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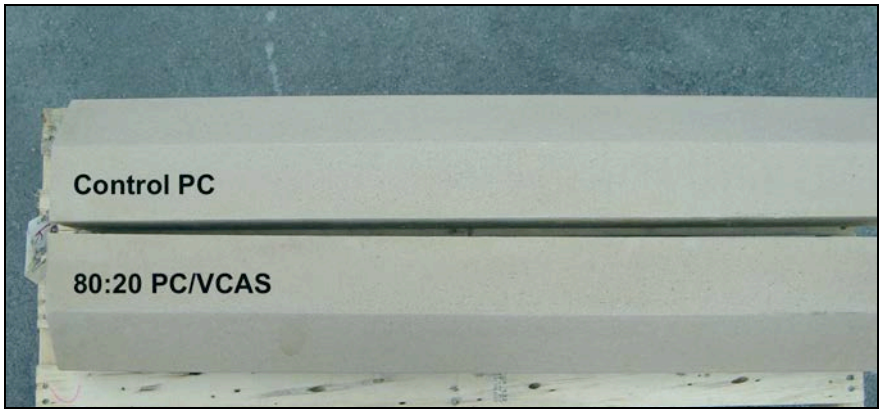

Architectural concrete beams: PC Control (top) and 80:20 PC/VCAS concrete (bottom)

Rapid Chloride Permeability (ASTM C1202)		
		Coulombs
Age (Days)	Control	80:20 VCAS
28	>6000	1600
56	9300	920
150	7500	400

Charge Passed	Chloride Ion Penetrability
>4000	High
2000-4000	Moderate
1000-2000	Low
100-1000	Very Low
<100	Negligible

The table *(left)* provides the results for Rapid Chloride Permeability (RCP) testing on cast cylinder samples (28-56 days) and recovered cores from the weathered exposure samples at 150 days. The control concrete exhibited very high values for chloride permeability, such that the 28-day test had to be halted due to excessive heat generation. The control concrete showed limited improvement with age. In contrast, the concrete with 20% VCAS Pozzolan showed markedly lower permeability values than the control at all ages, with continued significant improvement accompanying curing age. The later age samples in fact showed the low permeability values typically achieved for high performance silica fume concrete.

Block samples for the Control and VCAS concretes were tested for salt scaling resistance, where the finished surface of the concrete was exposed to a 3% sodium chloride solution and subjected in the saturated state to 50 cycles of freezing and thawing. Both concrete samples performed well in this test, with mass losses well below the 0.80 kg/m^3 value typically required to pass his test.

We hope this meets your needs at this time.

Yours truly,

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